NTY-NINTH YEAR OF SERVICE TO THE METAL WORKING INDUSTRY

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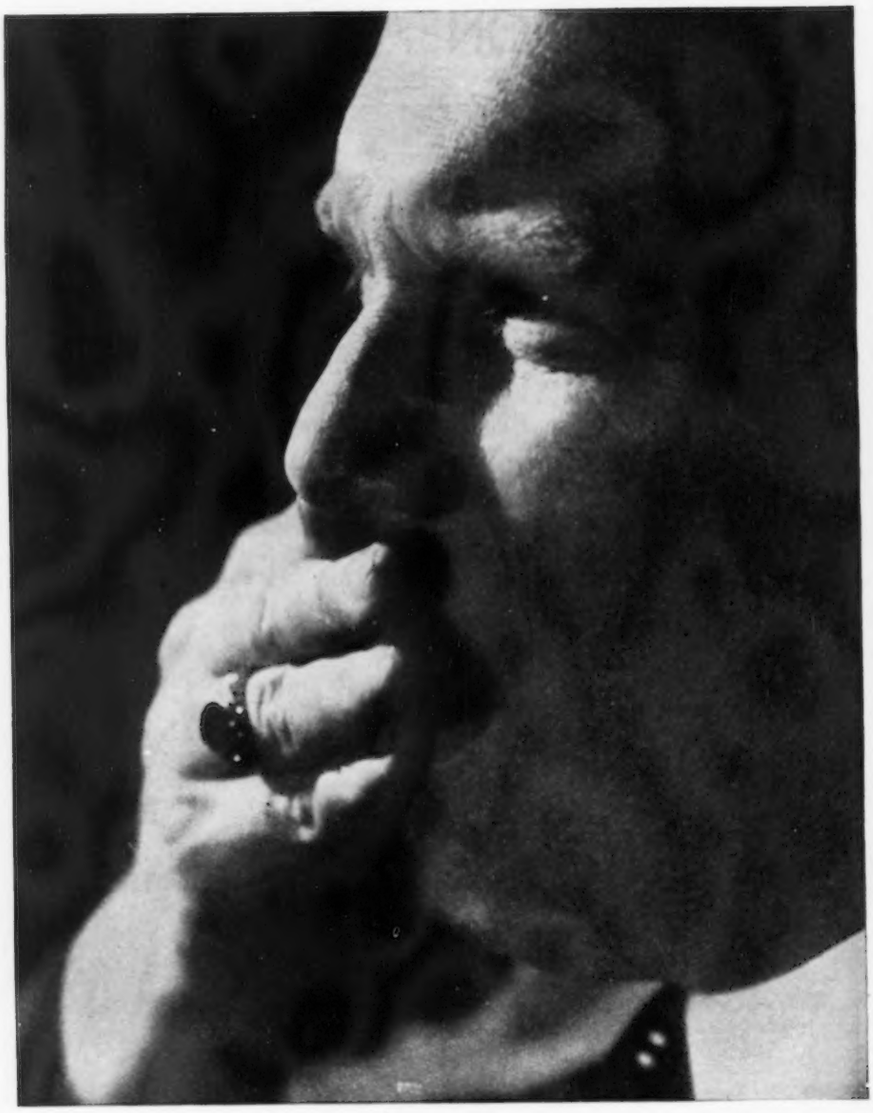

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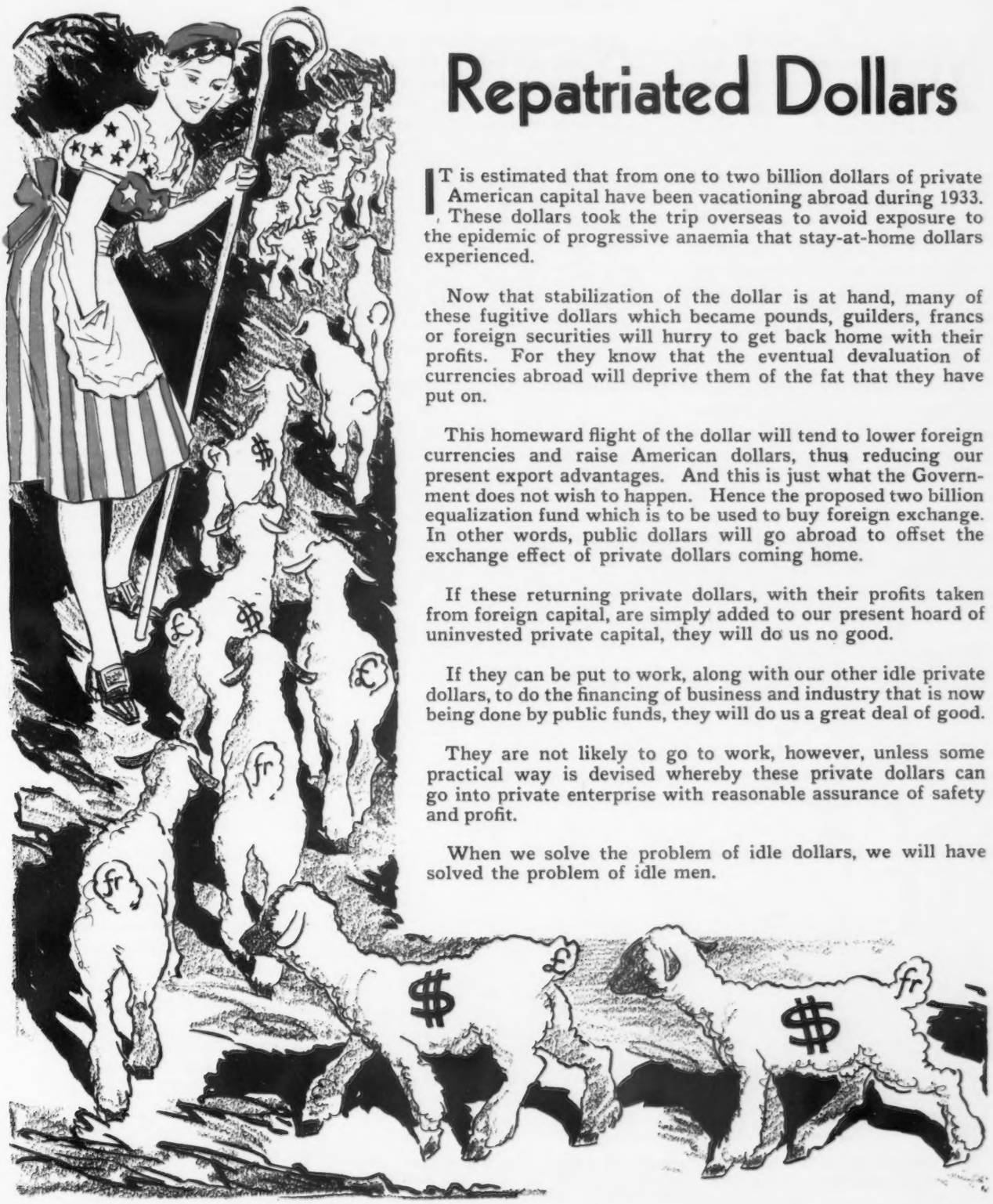


Repatriated Dollars

IT is estimated that from one to two billion dollars of private American capital have been vacationing abroad during 1933. These dollars took the trip overseas to avoid exposure to the epidemic of progressive anaemia that stay-at-home dollars experienced.

Now that stabilization of the dollar is at hand, many of these fugitive dollars which became pounds, guilders, francs or foreign securities will hurry to get back home with their profits. For they know that the eventual devaluation of currencies abroad will deprive them of the fat that they have put on.

This homeward flight of the dollar will tend to lower foreign currencies and raise American dollars, thus reducing our present export advantages. And this is just what the Government does not wish to happen. Hence the proposed two billion equalization fund which is to be used to buy foreign exchange. In other words, public dollars will go abroad to offset the exchange effect of private dollars coming home.

If these returning private dollars, with their profits taken from foreign capital, are simply added to our present hoard of uninvested private capital, they will do us no good.

If they can be put to work, along with our other idle private dollars, to do the financing of business and industry that is now being done by public funds, they will do us a great deal of good.

They are not likely to go to work, however, unless some practical way is devised whereby these private dollars can go into private enterprise with reasonable assurance of safety and profit.

When we solve the problem of idle dollars, we will have solved the problem of idle men.

Large Water Gates Machined by

AN outstanding project of the past year was the fabrication of the large gates that are to control the flow of water into the penstocks from the lake formed by Boulder Dam. This work entailed not only many unique welding problems, as shown in a previous article, but it involved unusual difficulties in machining, due to the large size and weight of the gates and to the accuracy required. Some of the ingenious adaptations of existing machine tool and assembly equipment devised for this work are described in this article.

MR. C. C. BRINTON'S outline of the welding of the water gates for the Boulder Canyon project in THE IRON AGE, of Oct. 19, 1933, showed a number of the special facilities that had to be provided for the fabrication of this large work. To an even greater extent, special methods and adaptations of machining and assembly equipment had to be devised and in the shortest possible time and with the greatest possible utilization of existing equipment. The equipment was adapted to the new work by the manufacturing division, with some necessary assistance from specialized departments of the works, such as the manufacturing equipment engineering department and the tool repair department.

As stated in the previous article these gates will control the flow of water into the penstocks from the lake formed by the Boulder Dam.

There will be four towers out in the lake, rising well above the surface, each tower forming the entrance to one of the four penstocks. There are two gates in each tower, one at the base of the tower and another of slightly lighter construction, at a point about 150 ft. above the bottom gate. The towers are 338 ft. high, with a clear inside diameter of 30 ft. and a maximum outside diameter of about 90 ft. They are of concrete fluted construction, as shown in Fig. 1, and will have on top a circular building containing the gate-actuating mechanism. Access to these towers will be had by means of bridges extending from the towers to the crest of the dam proper. The gates themselves have an outside diameter of about 32 ft. and a height overall of 10½ ft. The lower gate unit with appurtenances weighs about 261 tons and the upper gate, 212 tons.

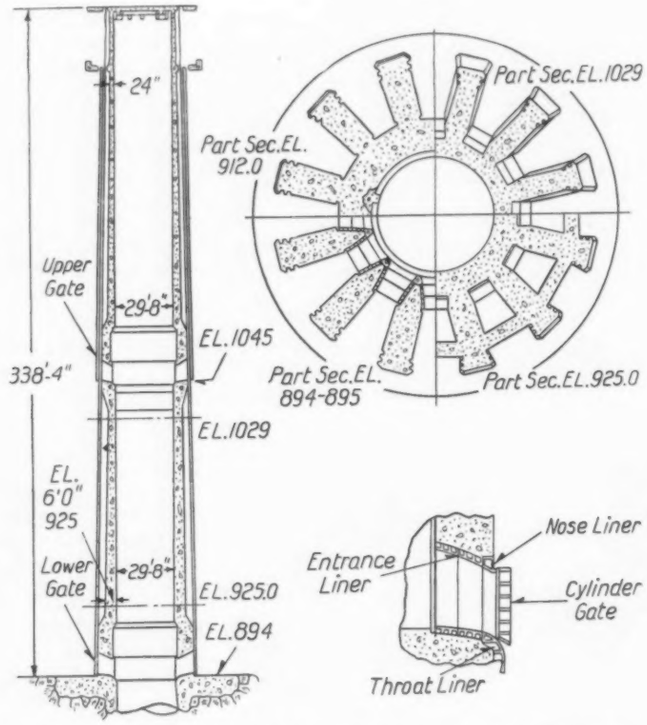


Fig. 1—Cross-section of Boulder Canyon intake tower. Equipped with two gates each, four of these towers will control the flow of water into the penstocks.

The assembly consists of three major portions, the gate itself (see Fig. 7), the nose liner, and the throat liner (see Fig. 3). The throat liner and nose liner with upper guide brackets are bolted together and built into the concrete of the tower, the gate being raised and lowered inside the nose liner. The nose liner contains the 12 water openings, each 6½ by 9¼ ft., has an inside diameter of 32 ft. and a maximum outside diameter of 36 ft. 3 in. The lower nose liner weighs 90 tons and the upper one, 72 tons.

The large size and weight of these parts together with the accuracy necessary made this job one of unusual difficulty, and some of the ways and means devised to do this work are described briefly in this article.

Operations on Throat Liner

The throat liner was made up of 12 castings bolted together to form a circle. Since there were 96 of these pieces on the order it seemed wise to provide some sort of set-up which would obviate as much handling as possible and at the same time assure a job machined to the close tolerances required. The first step was to plane the top flange to within ⅛ in. of the finish line. The second operation was planing the excess stock from the edge of the skirt, which is theuppermost partion as shown in Fig. 2. The first operation provided a flat surface upon which to

Specially Adapted Equipment ▲ ▲ ▲

By D. B. CHARTERS
Manufacturing Engineer, Generator Division
Westinghouse Electric & Mfg. Co.
East Pittsburgh

clamp the part for the milling and drilling of the end flanges. The segment was mounted on the rotating indexing table of a boring machine, in such a position that by milling to marks upon the table a segment of proper chord length and with proper end angles was obtained.

So close were these castings made and machined that the circle formed by bolting the 12 segments together was within ⅛ in. over or under a perfect circle with a maximum opening at partings of not more than 0.002 in. The drill jig, which may also be seen in Fig. 2, was designed so that by lining up the longer straight edge of the jig to the inner surface of the liner segment, the bolt holes were so placed as to bring the joints together with no offsets. In the field these segments are welded together in position and as much of the weld preparation was done on the mill as possible, the balance of the preparation around the curved portion being done by means of an air chisel.

Devise Special Facilities to Face Top Flange and Turn Monel Seats

When assembled the throat liner formed a circle with a maximum outside diameter of 36 ft. 3 in., which was beyond the capacity of any boring mill available. A standard 28-ft. mill was rearranged in the following manner to provide the needed facilities for facing the top flange and turning the monel metal seat which was mounted on this member of the assembly. The housings and rail were lifted from their foundations as a unit and moved away. The table was then enlarged to sufficient diameter by means of 12 large fabricated beams clamped on the table radially, extending out to a point sufficient to catch the lugs which were cast on the inner surface of the throat liner segments for this purpose. Provisions for carrying the cutting tools were made by using the housing of an openside planer, which was bolted to the foundation pads of the regular mill. In Fig. 3, the planer housing may be seen in place in the center background, also portions of the radial beams will be noticed extending below the skirt of the throat liner. The center post was employed for centering and taking measurements and was also used during the drilling of the monel metal seat which was mounted on the throat liner.

Operations on this piece were such as to make possible the use of star wheels and knockers mounted on the table. The outside of the skirt of the lower throat liner had to be turned for the connection to the steel penstock, but since the column of the openside planer was too far away to make use of the planer side head, another tool post was mounted on an angle plate and fed by means of a star wheel and a knocker mounted on the bottom of one of the radial beams. This tool post arrangement can just be discerned in the lower right hand corner of Fig. 3.

The radial drill seen at the left in this illustration was used for drilling and spot facing the bolt holes for attachment to the nose liner. The drilling of these holes while the throat liner was on the mill saved one dismantling and assembly operation and 12 awkward set-ups under a radial drill press.

The throat liner remained assembled until dismantled for shipment. It might be well to mention that the joints were held in proper alinement by means of 1½-in. taper dowels, so that no trouble would be

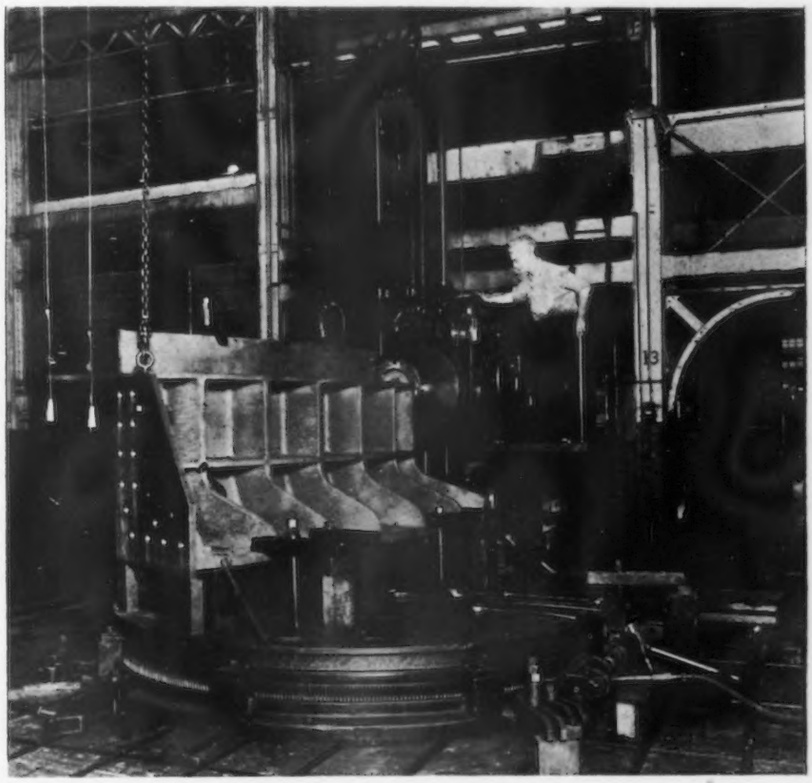


Fig. 2—Milling the partings of throat liner segments, 12 of which, bolted together, form the throat liner. The top flange was first planed to provide a flat surface to clamp the segment for milling and drilling the end flanges.

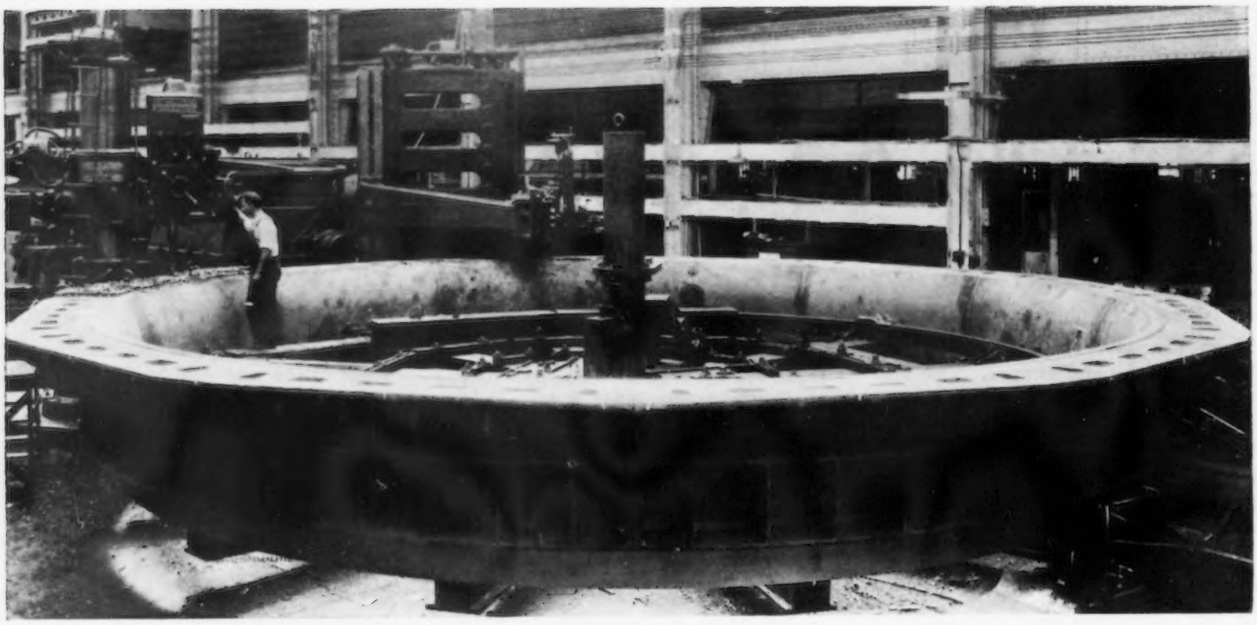


Fig. 3—Set-up for turning and drilling the throat liner and Monel metal seat. The table of a 28-ft. boring mill, enlarged by 12 fabricated beams, was used and the housing of an openside planer utilized for mounting the cutting tools. Other machining units included a tool post carried on an angle plate at the bottom of one of the radial table beams, as shown at the lower right, and a radial drill.

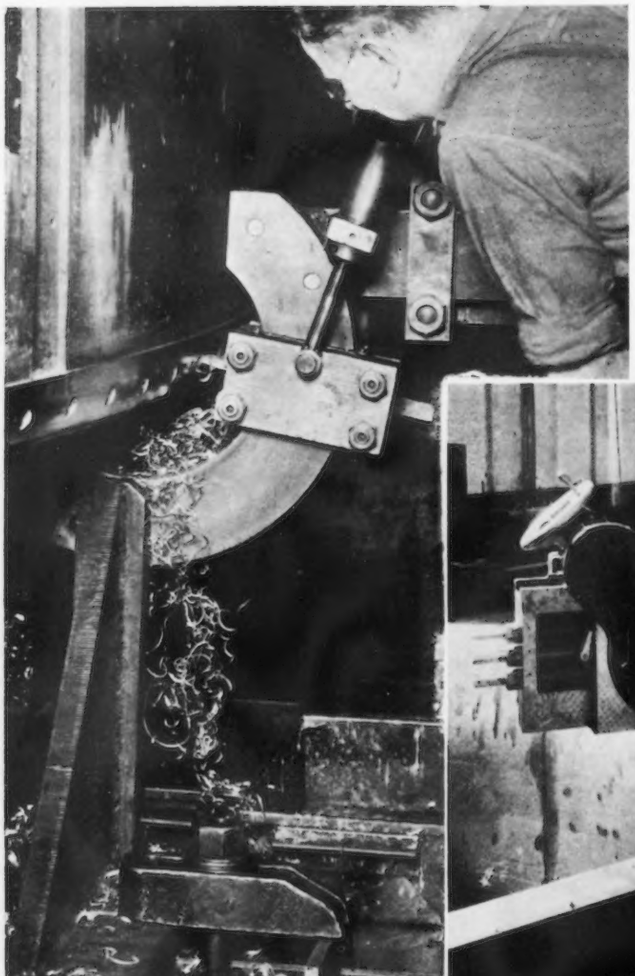
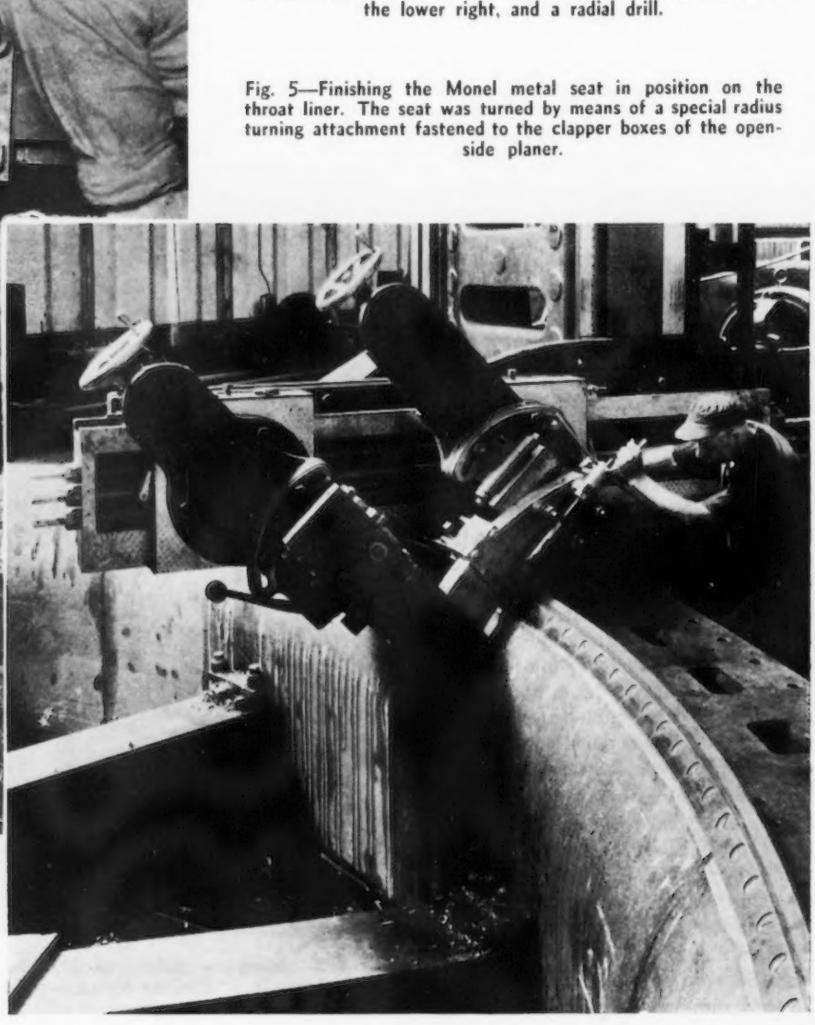


Fig. 6—Device used for forming the radius on the seat of the lower gate.

Fig. 5—Finishing the Monel metal seat in position on the throat liner. The seat was turned by means of a special radius turning attachment fastened to the clapper boxes of the openside planer.



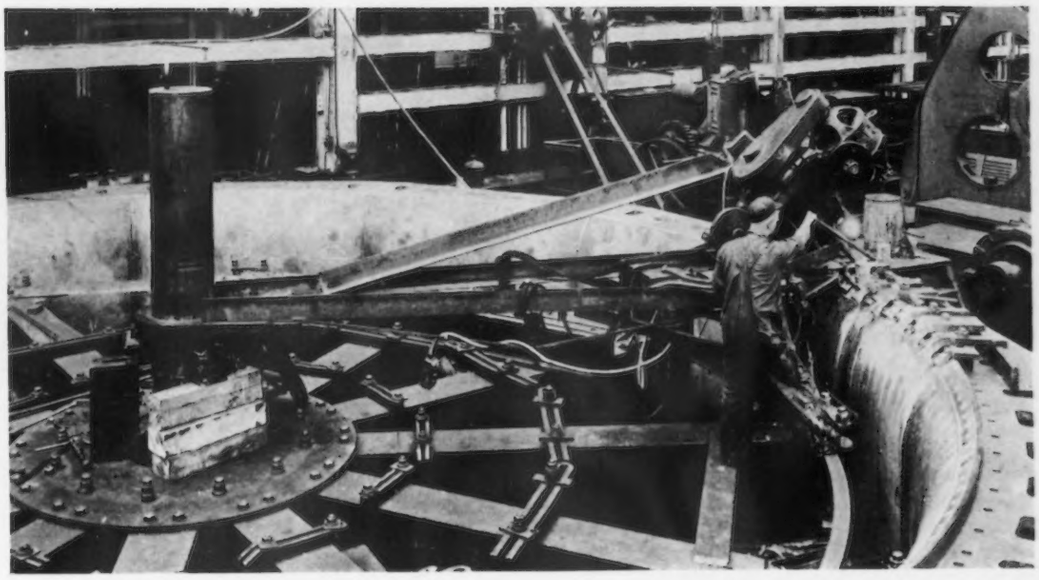


Fig. 4—Drilling and mounting of Monel metal seat. A combination clamping and drilling fixture was used to hold the seat in place. The special drill head was attached to an arm pivoted on the center column and supported by a frame equipped with wheels that run on a track.

encountered during assembly in the field.

Set-Up for Drilling Monel Seats

After the machine work as outlined above had been completed the monel metal seat was mounted in place. Fig. 4 shows clearly the set-up used for this purpose. The seat, in 12 sections, came to the job finished except for drilling. A combination clamping and drilling fixture was used for holding the seat in place. The drill press used was a special head taken from a machine for milling and drilling railway rocker rings. It was attached to an arm pivoted on the center column mentioned previously. The arm was supported by a frame equipped with two wheels that ran upon the track shown under the operator's right foot. This frame had a device for locking it to the rail so that it could neither shift nor lift up when drilling. The tap size drill was run through both the seat and throat liner to the proper depth, the hole was then opened up by means of a combination drill and countersink, after which the hole was tapped, cleaned out and the monel metal screw inserted and pulled tight before drilling was started on the next hole.

Seats Turned by Special Attachment

After the seat was mounted the drill press arrangement was removed, and the seat was turned by means of a special attachment fastened to the two clapper boxes of the open-side planer, as shown in Fig. 5.

The radius piece was mounted in proper relation to the seat by means of vertical and horizontal lines scribed upon it. Measurements were taken

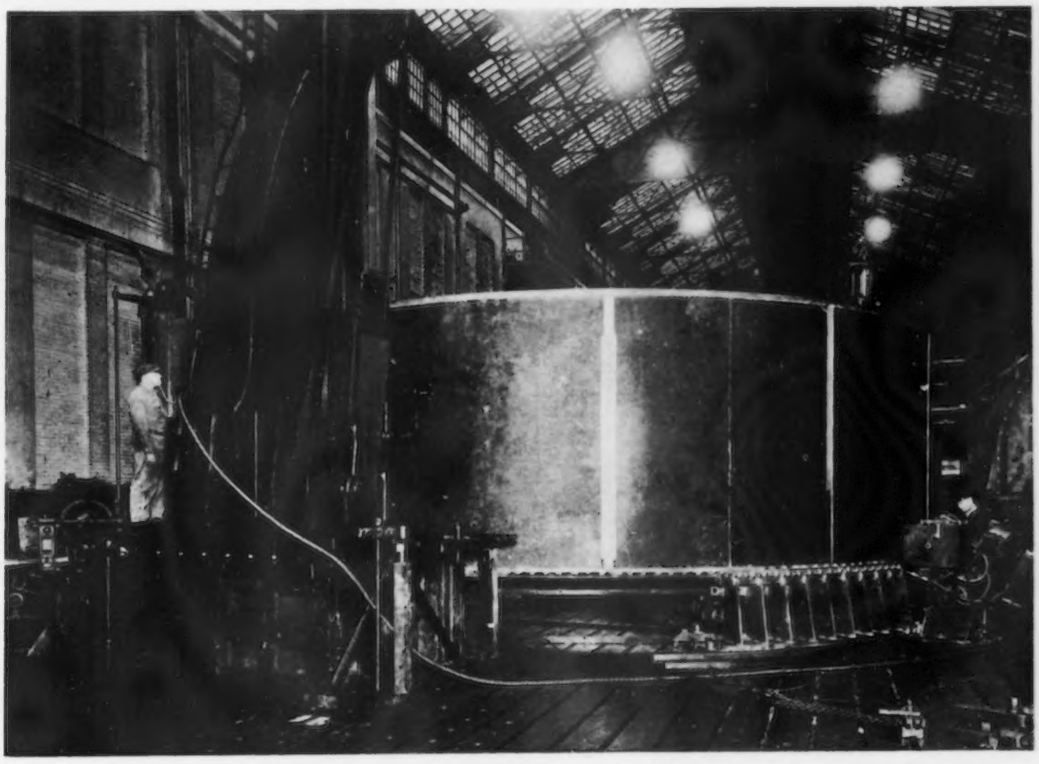


Fig. 7 — Merry-go-round device built to take the place of the large boring mill for many of the gate operations. It consists of a circular framework pivoted at the center and rotated on a circular track by means of a power-driven windlass. The device eliminated many separate set-ups and saved a great deal of time.

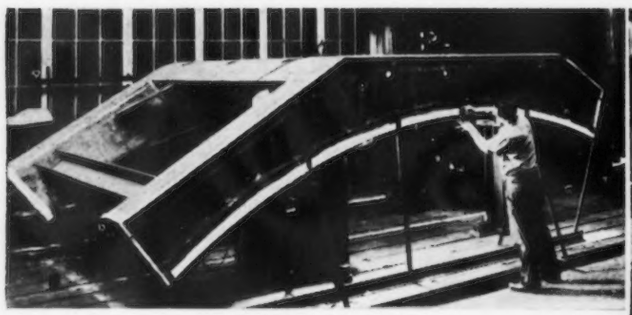


Fig. 8—Template employed for checking the shape of the nose liner.

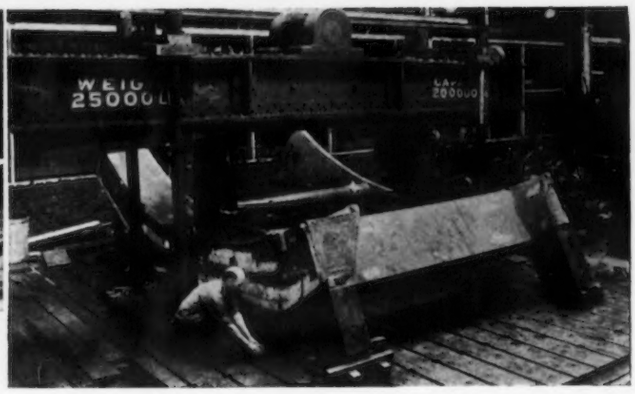


Fig. 9—Press for correcting distortion of liner segments due to welding. (at right).

from the finished back of the seat and the large flange surface. No attempt was made to provide a power feed since the operator had to be in constant attendance and the surface to be turned was short in the direction of the feed. There was between ⅛ and 3/16 in. of material left for finish on the curved surface.

Two roughing and one finishing cut were taken, the first two with round-nosed tools and the last with a wide tool having considerable lip and minimum clearance. Although very tough, the Monel metal finished very nicely. The tool was mounted to the rear of the tool post so that there would be no tendency to pull into the work. To assure a steady, smooth cut for finishing, it was necessary to run a hardwood block up against the bottom of the skirt of the throat liner. This removed the tendency to chatter which would naturally result from so much overhang of the work. After the finish cut was taken a motor-driven buffing wheel was employed to give a high finish to the surface.

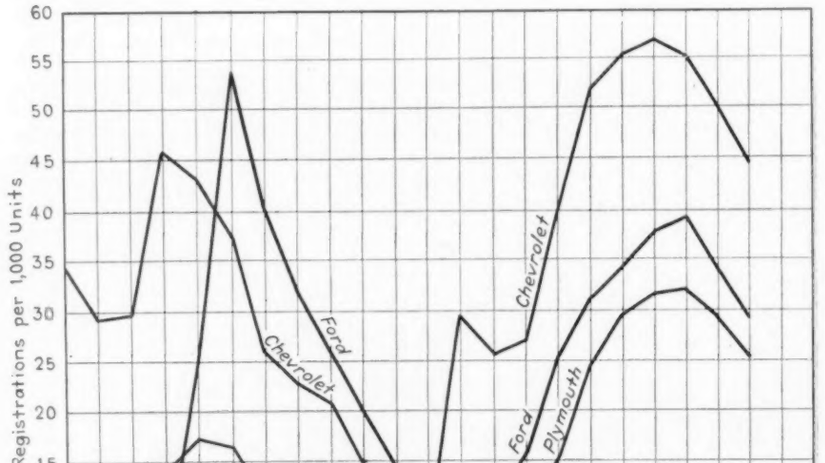
It might be mentioned in passing that at the final assembly of the gate unit water was poured into the space above the line of contact between the gate seat and that on the throat liner with no signs of leakage.

Fig. 6 shows a similar radius turning device used for forming the radius on the bottom gate seat.

Operations Speeded Up by "Merry-Go-Round" Device

Because of the need for speed the original plan to do all of the machining on the gate while mounted on the boring mill had to be altered, so a piece of apparatus known as the "merry-go-round" was built to take the place of the mill for many of the operations. This consisted of a comparatively light circular frame work pivoted in the center and rotating on a circular track on six roller-bearing wheels. Fig. 7 shows this device with several machines in place. The two machines at the left are a milling machine and slotter, used for making the vertical slots which carried the stainless steel guide shoes. At the right may be seen the combined drill jig and clamping fixture, which was used for attaching the lower monel metal seat to the gate, together with the drill press and its section of circular track. This device was rotated by means of a power-driven windlass, the snatch block and cable showing in the foreground. This device was a great time saver because of the elimination of a great many separate set-ups, since all of the drilling and slotting could be done here, many of the operations simultaneously.

The welded structures were large and heavy, the machining tolerances close and the amount of finish rather limited so that it was necessary to work very close to dimensions. Fig. 8 shows the checking fixture for the nose liner in use. The partings and other finish lines were indicated plainly so that any variations from the proper size were at once noticed and could be corrected on the press shown in Fig. 9. The press was made from a two crane lifting beam, and a cylinder and a pump taken from a hydraulic press.



Domestic passenger car registrations of the three leading automobile manufacturers during 1932 and the first 10 months of 1933 are charted above. The narrow spread between Ford and Plymouth sales in 1933 is especially noticeable.

Standardizing the Refining Period in Making Steel

By FOLKE W. SUNDBLAD

OF the three distinctly different phases of working an open-hearth heat, namely, charging, melting and refining, the last mentioned has been the least affected by progress. This resistance to change is probably due to the fact that the methods employed in "working the heat" have been entirely governed by the individual judgment of the furnace operator. Men found it to their advantage to guard religiously from an enterprising engineer the secrets of their trade, especially the art of reading steel tests. This was common practice until quite recently and, obviously, did not do any good in promoting progress.

The building of the modern so-called tonnage mill, however, opened a new era with great possibilities of making strides toward a more stabilized and standardized refining period of the heat. Already some important changes to this end have been made. The bigger the furnace, the more pronounced has the change become. Experience has shown that the larger bath has enough heat energy stored up to absorb great quantities of iron ore by way of the charging box without any material slowing-down of the lime boils. The result has been that "working the heat" has become a matter of timing the carbon reducing effects of the lime boils with those of the ore.

A perfectly timed heat would thus be one where the lime and ore boils cease somewhat above the desired carbon point, depending upon the temperature of the bath and the condition of the slag. In this connection it is interesting to note the vast difference between this practice and the one used in extremely small Swedish open-hearth furnaces making super high-grade steel. In this case "working the heat" means nothing else but letting the heat "ride" all the way down without the addition of any oxidizing agents whatsoever.

As the tonnage hour record of the furnace, as well as, to a certain extent, the uniformity of the product, is dependent upon the uniformity of methods employed in the refining period of the heat, it is evident that much would be gained if these methods could be standardized as much as possible. To add a known weight of iron ore in a single operation has given a strong impetus to this movement, principally because the furnace operator according to this practice can divide up the said period in well defined stages, the length of which, of course, depends upon the weight of the ore charged and the temperature of the bath. Consequently the result can be estimated with reasonable accuracy.

On the other hand a complete standardizing of a large open-hearth heat evidently is out of the question, mainly due to the impossibility of getting a uniform charge. The scrap naturally contains more or less oxides of iron in the form of rust. Besides, the enormously increased use of fast melting scrap from the automotive and can industries without a corresponding increase in charging speed tends to produce a vast amount of iron oxides. These, together with the heat-to-heat variations in silicates added to the bath by the hot metal, will somewhat influence the speed and degree of the carbon reducing process.

For these reasons, when seeking a yard stick that will apply to all large heats, the first step will be to separate the constant factors involved in the above mentioned timing process from those of a variable nature. In the first class we find:

The charging of the limestone and the scrap in such a manner as to clear the furnace bottom of the "middle door" far ahead of the other "doors."

In the second class:

1. To estimate the temperature and carbon of the bath at the time of ore addition.
2. To estimate the weight of the ore to be charged in order to oxidize the carbon a certain number of points.
3. To estimate how many points of carbon will be reduced by the residue limestone.

It is to be noted that the success of this timing process depends to a large extent upon the operator's ability to read the test piece ac-

(*Concluded on Page* 70)

▲ ▲ ▲ Molding Cast

ONE of the major problems confronting the foundryman specializing in millwright and transmission work is the economical molding of belt pulleys, particularly those ranging in size from 1 to 3 ft. in diameter and face depth from 6 to 18 in. Where pulley molding machines have been installed, a heavy outlay on patterns and flask equipment is unavoidable, and, unfortunately, the net results frequently do not warrant the initial investment.

There exists, however, a way of producing these particular castings by the "open sand" system, which deserves more publicity than it has attained, and a concise description of which follows. Fig. 1 shows a pulley casting about 3 ft. 6 in. in diameter, with a finished belt face depth of 16 in., of usual straight six-armed type, for heavy duty, which will serve as a general example.

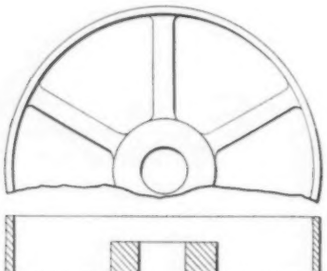


Fig. 1 — (Above), Heavy duty semi-steel belt pulley approximately 3½ ft. in diameter.

A loose iron rim pattern of the diameter required, plus contraction and machining allowances, is cast in an ordinary mold, either from a wooden master pattern, or swept up by spindle and segment equipment, and machined to the proper dimensions, the inside and outside faces being made parallel so as to give an even thickness all over, as taper is neither necessary nor desirable.

The depth of the rim pattern should be that of the maximum sized casting ever expected under ordinary conditions for a pulley having one set of arms only, as castings from minimum to maximum depth are easily made from a single pattern. The pattern used to form the arms consists of an independent six-armed spider casting with upper and lower half wooden hubs, fitted loose, and provided with coreprints of the desired size, hubs and prints being made interchangeable to permit a wider range of castings from a single pattern.

Drag or cheek part flasks only are needed, and may be of lumber or metal, the only stipulation as to their size being that they, whether stacked up in the form of shallow frames or made in single sections, shall approximate the depth of the pulley about to be molded, plus about ¾ in. extra depth on the pulley rim for machining allowance, this additional ring of metal being easily cut off in the lathe with a parting tool.

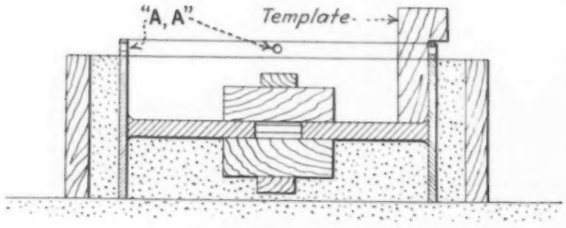


Fig. 2—(Above), Pulley drag mold rammed up showing arms bedded to correct depth by template. "A,A" are holes to allow insertion of hooks when drawing pattern.

When molding the pulley, the rim pattern is first set dead level on the foundry floor, the flask part being then laid on the floor outside the pattern, and the space between rim and flask lined up next the pattern with a suitable facing sand, rammed up full with heap sand and struck off flush with the edge of the flask in the usual way.

Following this operation, the arm spider and lower half of the hub pattern are bedded in to correct depth, by the use of a wooden template of the proper size, the mold at this stage being shown at Fig. 2.

Lifting Plate a Feature

Before completely making the parting round the arms, a lifting plate arrangement consisting of six castings bracketed together by six wrought iron clamps which are cast in, thus forming an integral unit, is bedded into the joint, the upper faces of the plates being stamped down level with the parting line along both sides of every arm.

The half inch or so of clearance space between plates and arms is next slicked down, and a little sharp or silica sand strewn over the area just slicked to secure a perfect separation when lifting the plate prior to removing the arm and hub sections of the pattern.

Fig. 3—Plan view of lifting plate set inside arms in pulley pattern.

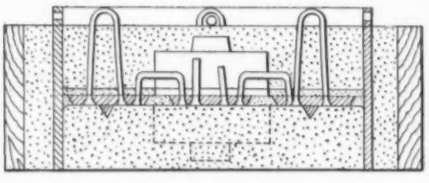


Fig. 4—(At right), Cross-section view of mold with lifting plate rammed up ready for pattern withdrawal.

It will be noted in the plan and cross-section views of the lifting plate, shown in Figs. 3 and 4, that a sharp taper allowance is provided, a feather edge being essential to obtain good results, and that three tapered foot guides, one on each alternate section,

Iron Belt Pulleys ▲ ▲ ▲

By J. H. EASTHAM

▲ ▲ ▲

THE author describes an open sand method of molding pulleys of both large and small size. It is recommended for its flexibility and for the savings it effects by avoiding heavy outlays for patterns and flask equipment.

▼ ▼ ▼

are cast on, to insure the plate being put back to absolutely correct position when finally closing the mold.

Incidentally, the best way to mold the plates when making the equipment, is to sink the six separate patterns into a specially constructed follow board, reverse side up, the binder clamps and lifting loops placed into special holes gaged in the patterns for their reception, the whole arrangement being then rammed up in a deep drag part, rolled over, the parting made, and the cope rammed up in the usual way.

After the cope is removed and the plate patterns drawn out, any loose sand around the projecting ends of the binder clamps and lifting loops is cleared away, and the mold closed and poured through spray gates from a central sprue.

Plates carefully made in this manner will last, given good treatment to avoid distortion, for many years. When the parting around the pulley arms has been made, the upper half of the hub pattern is set to place, the inside of the pulley is rammed up, a tough facing sand mixture being used and backed with heap sand, the inside being struck off level with or a fraction higher than the level of the outside diameter of the mold. In cases where the hub is exceptionally large, a ringed wood screw is used, as is usual when carrying loose pattern parts in an ordinary cope mold.

When about to ram the last inside course the gate pin is set into the hub pattern in accordance with regular pulley practice.

Removing Lifting Plate

After ramming is completed, and the mold strickled off level, the joint around the rim pattern is slicked and lightly swabbed with clear water, the rim pattern being then rapped and drawn out by hand or crane as size dictates, the holes A, A, Fig. 2, being used for this purpose. The plate is now ready for removal. A three-point lift with turnbuckles carefully drawn tight, or just enough to start the lift a little before hoisting, usually gives a clean lift.

As soon as the plate is hoisted clear of the drag mold and swung away, the hub pattern is drawn downward, any slightly broken edges repaired, and plumbago brushed over the face of the mold, rim, arms, and hub. The plate has been set down on a board or other flat surface, the three projecting guide feet functioning as supporting columns, and preventing any contact between the face of the mold and the foundry floor.

The spider pattern forming the arms is next swabbed and drawn from the sand, then the lower half of the hub pattern; the mold is finished and dusted with plumbago from a fine bag, this partly to avoid waste, and also to prevent undue accumulation of lead in the bottom of the rim.

The mold is then slicked, the hub core set to position, and the three inverted conical prints left by the guide feet deepened a half inch or so by the insertion of a pointed round bar of less diameter than the diameter of the guide feet at their junction with the plates. This precaution obviously insures a little clearance under the guide feet, and removes the risk of a crush at any of the three points, particularly when molding pulleys of small diameter, when the guide pins are of necessity fairly close to the rim mold.

Another precaution worth noting is to allow plenty of taper on the upper hub coreprint, this also with the intention of avoiding crushes when lowering the plate back to place, an operation easily accomplished by a single craftsman when making the smaller sizes, or two men when the greater diameters are being handled. Thickness gage sticks may be used at three

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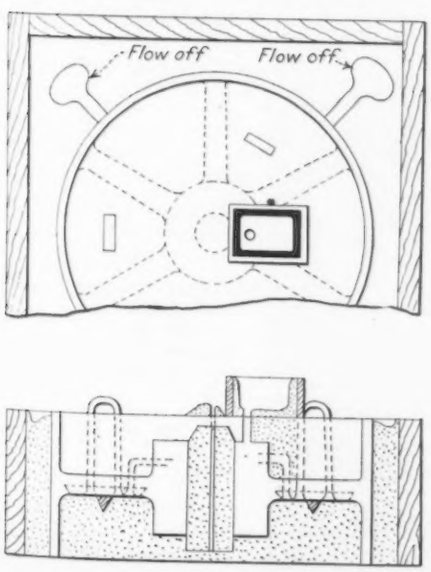
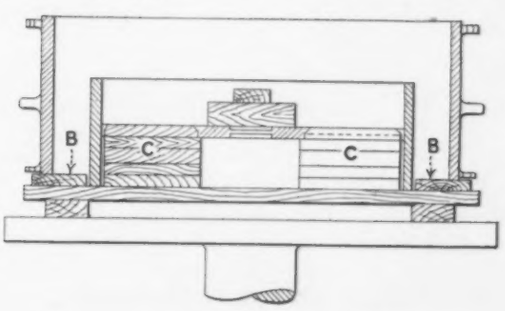


Fig. 5—(At left), Plan and sectional views of finished pulley mold.

Fig. 6—(Below), Adjustable follow board with pulley pattern and flask placed on plain jolt machine table ready for production. Interchangeable lagging indicated at "B,B" and "C,C."



How Attractive Finish Helps Metal

FOR several years the design of specialized pickling equipment ran far ahead of available materials, but now materials have caught up and the manufacturer of metal parts is offered automatic and individualized pickling machinery to suit his needs. Some of the modern equipment features are described in this third article on pickling, in a series devoted to metal finishing.

THE further a manufacturing process is removed from the initial raw material, the more specialized does it tend to be. Thus, finishing operations are frequently of an individualized or non-standard character, and the equipment is often custom made for the job. Pickling, however, is associated not only with the finished product but with the raw material as well, and the range of equipment varies from highly standardized apparatus to elaborate machines designed for the pickling and handling in mass production of one particular product.

In previous articles it was pointed out that full economies in pickling could be effected only through full coordination of processes before and after descaling. Take, for instance, a plant which manufactures bicycles. Here many small parts are machined, heat treated, pickled, and plated. Other parts are forged, pickled, machined, heat treated, pickled again, and then ground. Certain frame parts such as the front fork tube may be heated and formed and then pickled and enameled.

Some of the factors pertaining to pickling, which the manufacturer of such a plant should consider and which already have been discussed at more or less length, are: relation of good pickling to good final finish, selection of cutting and quenching oils to facilitate scale removal, use of reducing atmosphere in heat treatment to avoid one or more pickling operations, importance of proper pickling technique, and economy in correct location of pickling equipment.

Assuming that the manufacturer has studied all of these features, he then is ready to consider the selection of pickling equipment. Today, in 1934, he is fortunate in having adequate materials and a great variety of ingenious designs to choose from.

A research engineer of the Bakelite Corpn., in commenting on the development of equipment, said: "Initially, design provides the important advance; eventually, in any type of mechanism, material becomes the determining factor."

The first advance carried the design of pickling equipment far beyond the ability of materials to cooperate and it is only now that the fabricator of pickling machinery has materials suitable for all parts and for all types of pickling solutions.

The recent rapid increase in the development and use of corrosion resisting alloys has brought a close association and interdependence between these materials and the pickling process. Some of the nickel alloys seem to be particularly resistant to the acids commonly used in pickling steel, and their life even under severe service in pickling may exceed six or seven years.

Wire Baskets

Despite a rapid advance in belt type continuous pickling equipment, the wire basket in one form or another still remains the usual container for small parts which are to be pickled. Wire baskets are usually made of aluminum, Monel metal, copper, brass, nickel chromium, and steel. However, in addition to these, many new alloys are appearing. The nature of the pickling process of course determines to a large extent the material best suited for equipment.

Aluminum is attacked but slowly by both nitric and sulphuric acids, but is more rapidly attacked by alkalis and by nearly all concentrations of hydrofluoric acid. Monel metal, which is an alloy of nickel and copper, is re-

Small stampings are pickled and polished previous to plating, in relatively inexpensive rotating drums.

Products Sales

By HERBERT R. SIMONDS

8—Selecting the Pickling Equipment

sistant to nearly all acids used in pickling except nitric, and has a long life in alkalis. Brass is used in a good many of the alkali solutions, but is not suitable in cyanide and is not as strong in its usual form as some of the other alloys. It is not attacked by hydrofluoric acid and is used to some extent in dilute solutions of sulphuric and muriatic acids. It is attacked by hot concentrated sulphuric acid and by nitric acid. When the cycle embodies both an alkali and a nitric acid dip, nickel chromium is frequently used. This material is not attacked by alkalis and is resistant to the common acids used in pickling. In addition to this, it has high strength value and is not affected by any temperatures normally encountered in pickling.

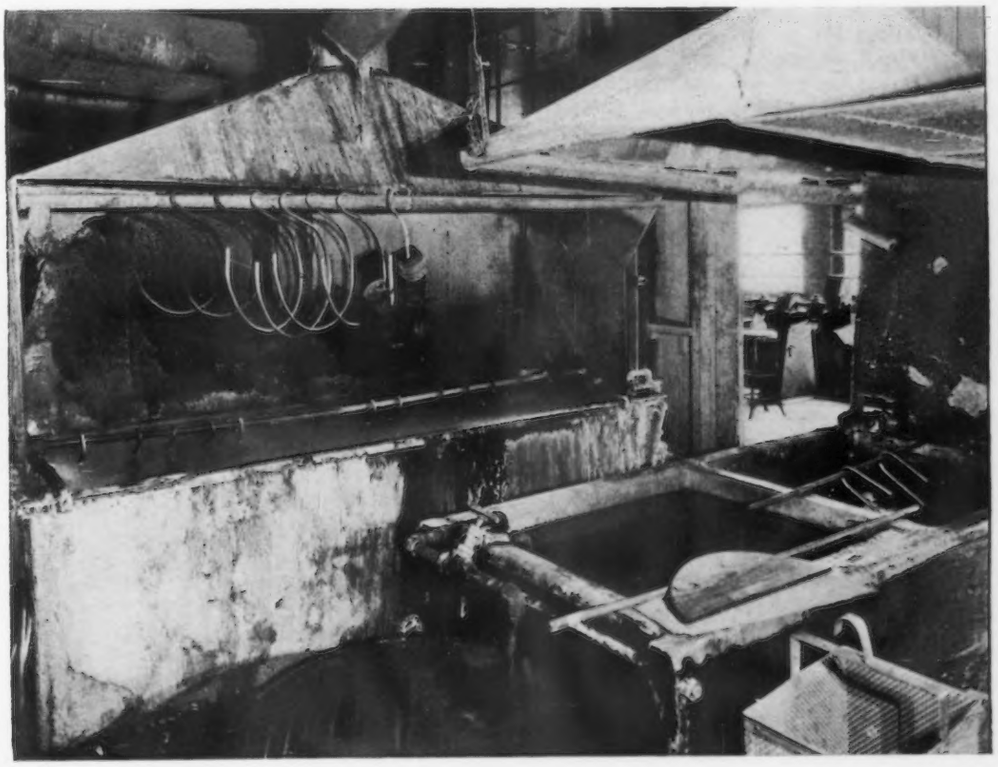
Suitable wire for making baskets is obtainable in all of the above-mentioned materials, and these wires lend themselves to welding and other usual forms of fabrication.

Tanks

The bugbear of the pickling business for many years was the tank or container, and shortcomings in this line were responsible for the early separation of the pickling department from the rest of the plant. Now greatly improved tanks and lining materials have been a big factor in bringing the pickling operation back into the main production room. The more common types of tanks are wood, either lined or unlined, steel, masonry, and concrete. Each material may be used with a variety of linings. The wood tank is still commonly used because of its low first cost. A recent study of wood pickling tanks indicated that the expected life will range from one to five years, depending upon the way the tank is made and upon the nature and temperature of acids used. Usually wood pickling tanks require much repair and maintenance and, in addition to this, they leak acid.

A leaky tank not only causes a direct loss of acid, but is a source of much indirect loss. First, it causes damage to floors and surroundings, and second, and more important, it creates operating inefficiencies and, as mentioned, necessitates an isolated location. Wood tanks with lead linings have proved successful in many installations where the operations are of a jobbing or intermittent character. Lead linings in steel tanks have the disadvantage that if a seam opens up or the lead is punctured, the acid may fill the space between the lead and the steel and may practically ruin the tank before the leak is discovered.

Masonry construction is often



In the small shop one operator often handles material efficiently through pickling and rinsing operations. The tanks should be conveniently located and should be provided with hoods and an ample exhaust system.

highly satisfactory, but it is hard to install and when cracks do develop they are difficult to repair. One of the good designs consists of two 4-in. courses of brick with a layer of asphaltic material between them. This is expensive, but when properly installed, is satisfactory at most any temperature or concentration of acid. The usual rubber linings have a short life at high temperature, but where the maximum temperature is below 150 deg. F. they offer many advantages. If punctured, they are easily repaired, and they may be vulcanized intimately to a steel or metal surface. This means that in case of a puncture, the acid is limited to one spot and therefore eats a hole through the metal container and so is discovered before much damage is done.

New Materials for Tanks

Recently some designers of pickling equipment have turned to the simplest of all types of construction, a metal tank made of some resistant alloy such as Monel metal without any lining or backing. The first cost of such a tank is high, but for certain processes it has offsetting advantages. One of the disadvantages is heat dissipation when high temperatures are used.

New materials for pickling tanks are constantly appearing, so that the best construction one year may not be the best the next year. It is important for the manufacturer who contemplates buying pickling equipment to keep in mind that the first cost is the least of his troubles. A poorly located machine or a leaky tank will offset the initial economy in a surprisingly short time.

A quotation from Percy Kingsbury, chief engineer, General Ceramics Co., may illustrate what may be expected in the line of new materials for pickling operations.

> "Chemical stoneware offers many advantages for the modern pickling plant. It is unaffected by corrosive agents other than hydrofluoric acid, and complete tanks may be made in one piece with no joints or seams. Tanks of this material usually have rounded corners and a smooth, bright acid-proof glazed surface, making them easy to keep clean. It is important that this type of tank be carefully installed so that its weight is evenly distributed over the entire bearing surface. The tank should be protected from mechanical abuse, from sudden changes in temperature, and from local overheating."

Special Machinery

Automatic machinery has been developed for pickling nearly all products which have sufficient mass production to warrant the expense. Some idea of the diversity of this equipment may be had from a recent statement of G. T. Potthoff, president of the U. S. Galvanizing & Plating Equipment Corpn.

> "A rotary drum type of pickling and cleaning apparatus has been developed for medium-sized stampings such as conduit boxes. This consists of a series of six or more tanks, in each of which a drum is partially immersed. The drums are all mounted on a large central, hollow shaft which provides the means of conveying the parts progressively forward from one drum to the next.
>
> "A semi-automatic pickling, cleaning, and acid-dipping machine of the hopper type has been developed for knife, fork, and spoon blanks and other similar articles. This machine usually operates in conjunction with a continuous hopper chain attachment which carries the parts through a drying oven.
>
> "Elaborate automatic cylinder type machines have been built for descaling brass and other stampings after annealing. In one particular case the apparatus includes a chain device which carries a series of wire screen cylinders, containing the parts, through the required pickling and cleaning solutions. The equipment is provided with automatic electric control so that the travel of the cylinders is periodically stopped to permit loading and unloading at opposite ends of the machine.
>
> "Large work calling for mass production, such as fire extinguisher shells, is handled through the pickling operation on a tray type of machine in which the principle is similar to the cylinder type except of course that the feature of the revolving cylinder in the solution is omitted in the case of the trays. If desired in the tray machine, agitation may be secured by submerged pumps.
>
> "Small electric fan and motor parts are pickled before enameling in a full automatic pickling, cleaning and drying unit.
>
> "Electrical conduit requires an elaborate special construction when the operation is continuous through several processes. One machine has been built for an automatic continuous sequence through 17 different operations"

When production is of a less specialized character, that is, when many different parts are to be put through at one time, more simple equipment is available. Typical of such equipment is the batch process rotary pickling machine manufactured by N. Ransohoff, Inc. One of these units is described by Mr. Ransohoff as follows:

> "It includes a rubber lined, star return barrel with rubber lined tank underneath and acid-proof pump for circulating the solution over the work

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In larger installations conveyors and special handling machinery reduce the labor cost in the pickling department.

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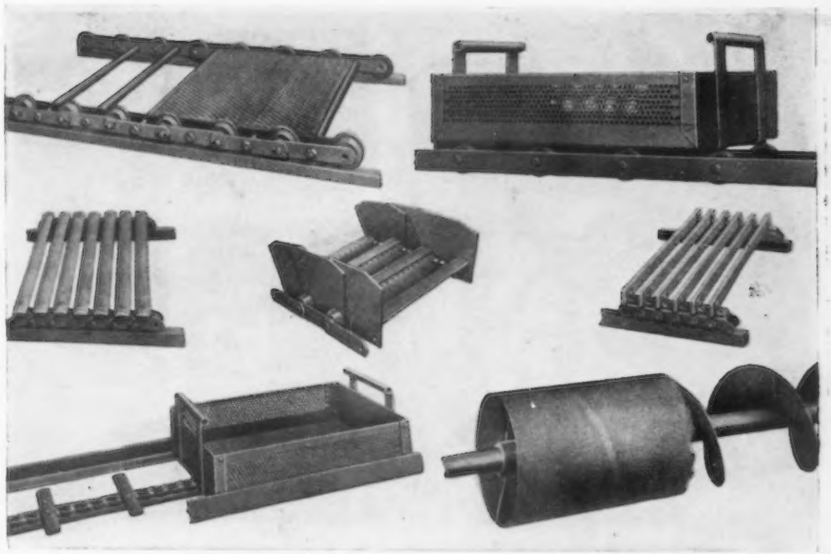
while the tumbling is taking place. By reversing the direction of rotation of the barrel the work is discharged and carried through a draining screen, after which it is subjected to a hot spray of basic cleaning compound. This washes off the tumbling sludge, neutralizes any remaining acids, and at the same time brings the work to a sufficiently high temperature to dry of its own heat. The addition of stars to the tumbling process enables a weaker acid to be used, since the acid loosens the scale which is then removed by the action of the stars, leaving the work with a bright and silvery finish."

Fastenings and Crates

When wood tanks are used, it is important to have the bolts and fastenings made of a material which resists acids, and in fact all miscellaneous equipment which comes in contact with the pickling operation should be studied from the point of view of corrosion either from direct contact or from fumes. Some of the features of tank hoods and continuous equipment have already been described. In the use of general open tanks much special handling equipment is often required. The International Nickel Co., which has made a special study of this phase of the problem, says that surprising economies in handling through the pickling operation may be made by using the proper type of crates and containers. The company reports that the American Rolling Mill Co. successfully uses a crib type of lead-lined wood tank built by the Hauser Stander Tank Co., that Williams & Co. uses chains made of Monel metal for handling bars in and out of boiling sulphuric acid, that the Union Steel Products Co. uses metal pickling crates built of angles and flats at its Albion, Mich., plant, and that a large Monel metal cage is used by a firm in Great Britain for holding hollow metalware as it is revolved and agitated in a pickling bath. One feature of this cage is the use of expanded Monel sheet as a lining.

Pickling Solutions

Some of the standard pickling solutions have been described and the value of inhibitors has been suggested. The subject is so extensive and the number of variables in each case so great that only certain broad principles can be indicated here. In most pickling there are losses and these should be carefully balanced one against another in the analysis of each case. There may be a loss of base metal, but the speed of the operation may cause an overall saving to compensate. The use of an inhibitor is most always advisable, but in some cases and with some inhibitors the saving in acid and base metal is offset by the attendant production delay. Some electro-chemical descaling processes are said to avoid loss of base metal without introducing disadvantages to balance.



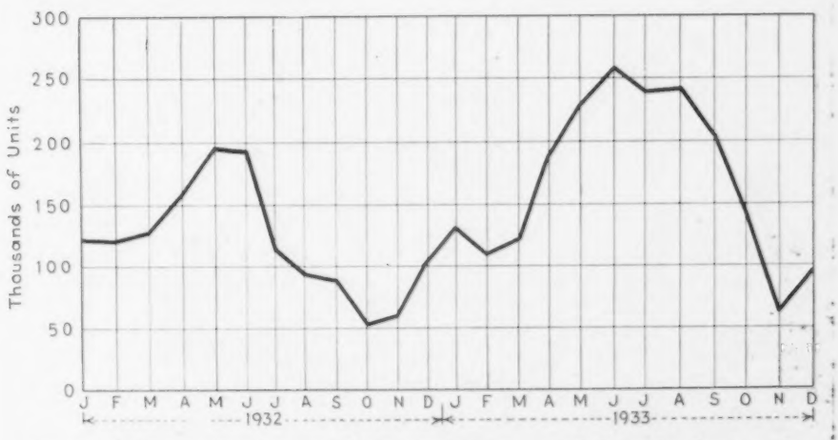
This shows a few typical conveyors used in cleaning and pickling processes. Courtesy Magnus Chemical Co.

In addition to the large number of commercial inhibitors available, some humble products such as flour and yeast are often used to advantage. Another common product, salt, is sometimes added, not as an inhibitor, but to improve the quality of the work. Sulphuric acid reacts with the salt to form hydrochloric acid and the presence of both acids in the bath helps in particular cases. The American Chemical Paint Co. gives 0.2 lb. salt to a gal. of water as the average proportion.

The strength of a pickle bath is a highly important factor in the overall economy. Picklers often taste a solution to determine its strength, but at best this method does not indicate the amount of ferrous sulphate in the bath.

The rate of evolution of gas is another makeshift strength indication. Simple strength testing outfits for pickle baths are inexpensive and provide adequate means for intelligent operation.

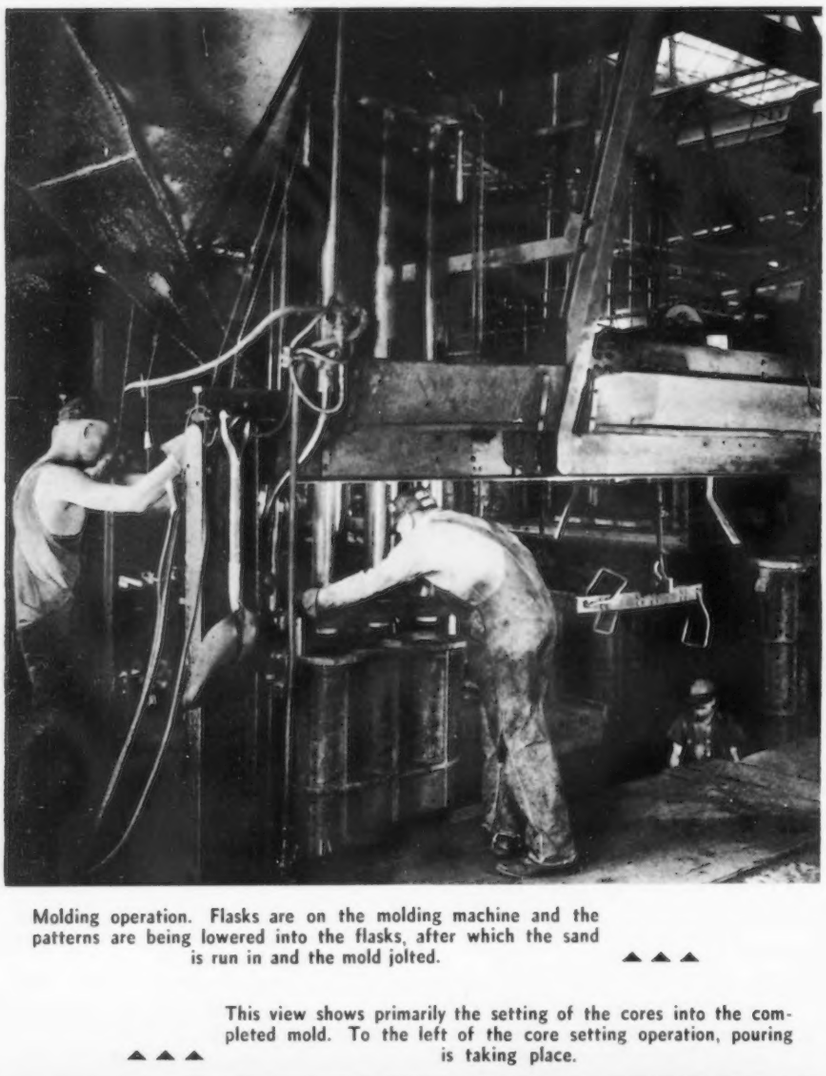
Many ingenious devices have been built to automatically regulate the supply of acids and the temperatures in pickling. In this connection, Proportioneers, Inc., Providence, R. I., states that standard water meters can "feel" the rate of flow and thus can be made to dictate the stroking rates of reagent pumps.



Automobile production in the United States and Canada during the past two years is shown on the above chart. Note the absence of the usual seasonal decline in June, July, August and September of 1933.

A Molding

By J. B. NEALEY
American Gas Association



Molding operation. Flasks are on the molding machine and the patterns are being lowered into the flasks, after which the sand is run in and the mold jolted.

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This view shows primarily the setting of the cores into the completed mold. To the left of the core setting operation, pouring is taking place.

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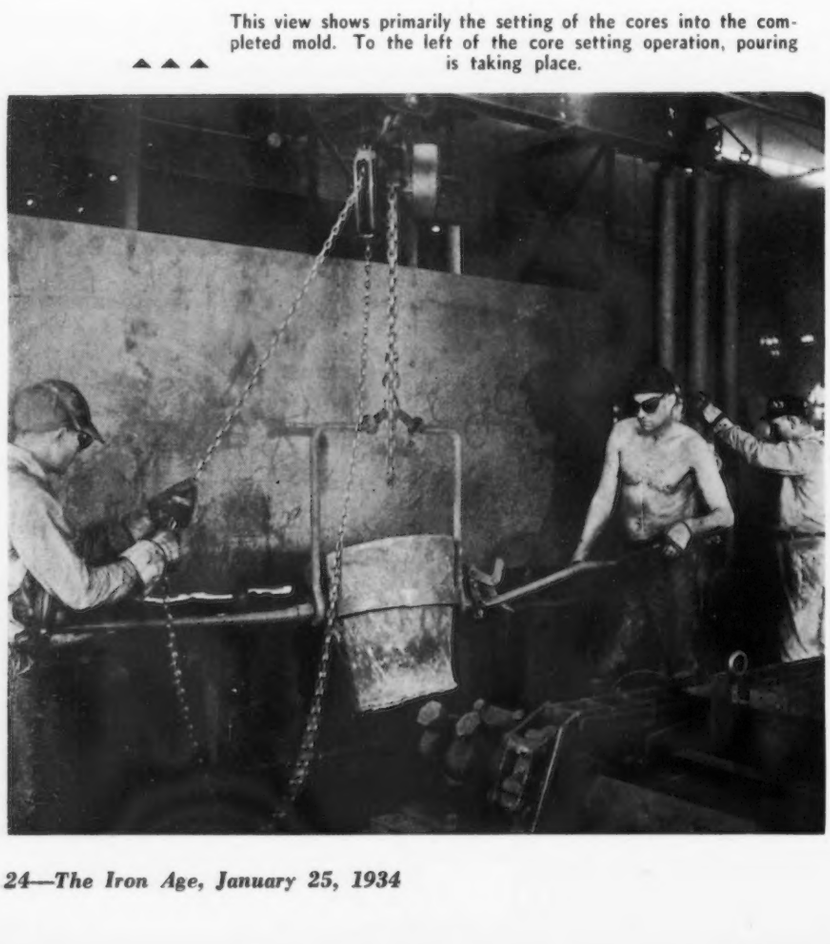

ALL foundrymen strive for the ideal mass production set-up, but few ever attain it. This is grouping of all operations such as core making, baking, flask molding, pouring, shake-out, etc., about a looped traveling conveyor so that these different operations can be standardized, synchronized and speeded up. Therefore the description of such a unit which has been perfected at the Springfield, Ill., plant of the American Radiator Co. will be of interest. It was made possible by a gas-fired conveyorized core oven.

Cast iron pipe from 1½ in. to 6 in. in diameter and 6 ft. in length is made here, and there are two of these combination core-making, molding and sand-casting units. One unit will produce 1800 lengths of 1½-in. pipe and the other will make 800 lengths of 6-in. pipe in an 8-hr. day. This pipe will average 6 ft. in length.

The molds or flasks are of cast iron and three molds are cast in a single unit. In other words, the three are in a single solid piece and are not divided into cope and drag.

The conveyor is of the roller type, consisting of two parallel rows of rollers, 80 ft. long and 6 ft. apart, with roller cross-overs or transfers at each end. This is sunk in a pit below the floor level to facilitate the handling of the tall molds. These molds stand on bottom plates which ride on the rollers and the lines of molds are pushed along by pneumatic pushers placed at each of the four corners of the conveyor.

At the right and left respectively of the starting end of the conveyor unit are the molding and core-making operations with the charging end of the core oven adjacent to the latter. This oven runs parallel to one side of the conveyor. An empty flask is transferred by crane to a jolting machine, clamped into position, and three

Unit for Mass Production

CAST iron pipe, from 1½ in. to 6 in. diameter and in 6-ft. lengths, is cast in permanent molds in the highly mechanized Springfield plant units of the American Radiator Co. All operations are synchronized by means of a loop conveyor and the installation represents the present ultimate in mass production of simple castings.

patterns, connected by a yoke, are lowered into the three openings. Sand is then poured between the mold and pattern walls and jolted to form the sand linings. The patterns are then pulled by the hoist and the mold is unclamped and placed on the conveyor, ready to be pushed to the next station.

Cores are made in cast iron forms, three core openings to a form. A form is placed on a jolt machine and three cast iron rods, joined by an arbor, handled by a hoist, are lowered into it. Sand from a hopper is then fed in and the core is jolted. The forms are then opened and the arbor and green cores hung on a traveling chain conveyor operating through a gas-fired core-baking oven. There are two of these core-making units and two loop chain conveyors through the oven, which is double. During the process of core making the arbor and core rods are handled by hoist up to the moment the core is hung on the chain conveyor.

The oven, which is of sheet steel construction and refractory lined, is 60 ft. long, 8 ft. high and 6 ft. wide. It is fired with 90 gas burners, 45 on each side, using gas at 5 or 6 lb. to inspirate air for combustion. They are located just above the floor line. Gas is the fuel standardized upon in this plant because of its efficiency, controllability and economy. The cores are baked at 450 deg. F. for 1½ to 2 hr., depending upon the size.

In the meantime the prepared flasks or molds which have been gas baked are pushed along that side of the roller conveyor closest to the oven and

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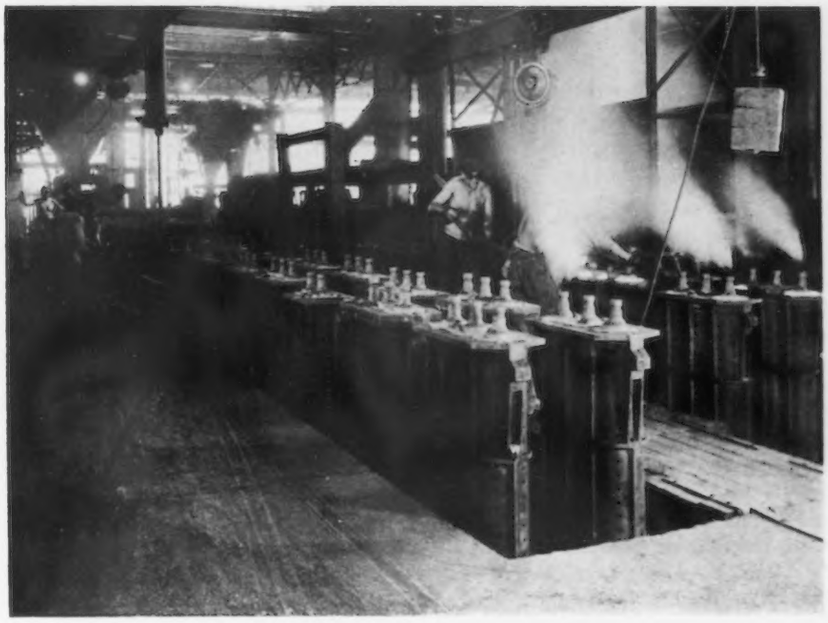
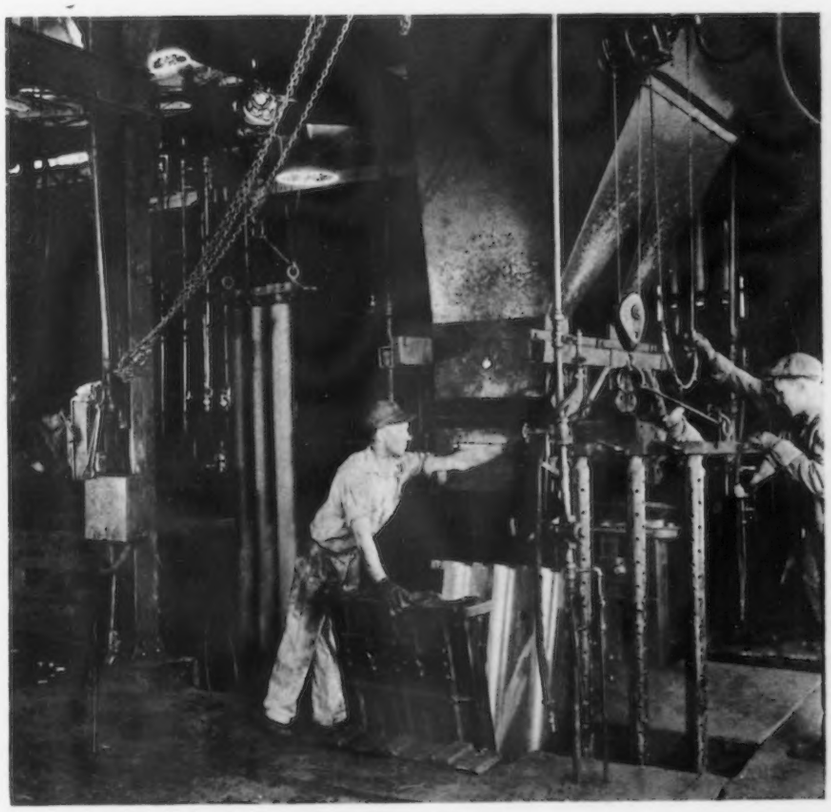


The entire set-up with pouring in foreground. Note core-making and molding units in background together with automatic and continuous gas-fired furnace for core baking. Gas-fired mold dryers are located under the molds.

Core making—shows the operators ready to set the arbors in the core box prior to jolting.



Rolling Mill

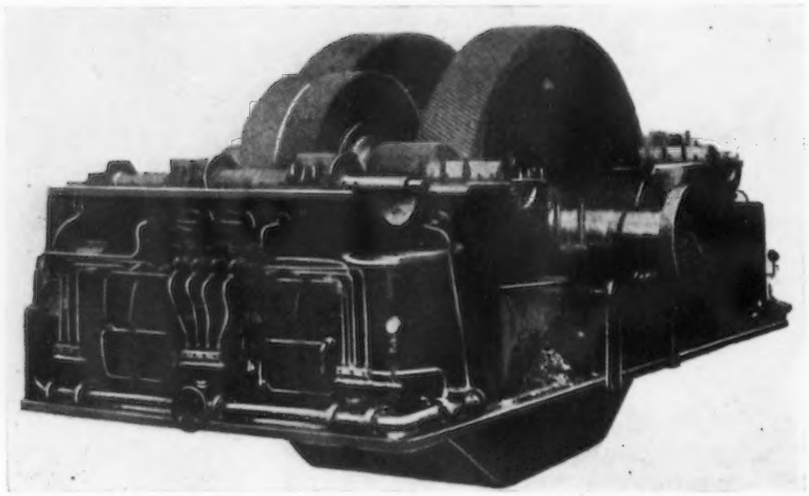


Fig. 1—Speed-reducing unit employs fine pitch gears, and the low-speed gears are in two sections and the first gears in one piece. ▲▲▲

FROM a comprehensive paper on rolling mill speed-reducing units, contributed by Thomas Holloway, gear consultant, United Engineering & Foundry Co., Pittsburgh, to the annual meeting of the Association of Iron and Steel Electrical Engineers, the following has been taken on the design and material of gears for the purpose:

The most common cause of trouble with gears is inaccuracy of manufacture, due to the use of obsolete machinery and methods. A secondary cause is faulty design and, occasionally, there is incorrect lubrication. It is only during the past 15 years, and particularly the last decade, that gears have been placed in service which closely comply to theoretical requirements.

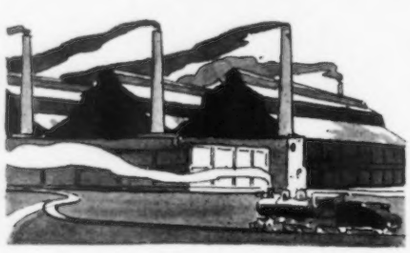
Broadly, there are two methods used for manufacturing gears, namely, forming and generating. The generating methods may be still further divided into hobbing and shaping, both of which methods produce an accurate and silently operating gear provided reasonable care is exercised in the machine shop.

With the forming method, which includes the use of end mills, rotary milling cutters, and template planers, there are so many difficulties encountered that they should never be employed for high-speed gearing. It is obvious that any forming tool must be designed to represent the true tooth form when it is in the correct relation to the gear blank and the many difficulties of maintaining this relation around the periphery of a gear are apparent. The cutting edges become dull long before a gear is finished, necessitating resharpening and providing opportunities for error both in grinding the contour and resetting.

Shaper Method of Generation

To discriminate between the hobbing and shaping methods is not easy because both processes have been developed intensively in the last few years, and it is probable that the critical advances in each method are known thoroughly only to the specialists in each branch. It is clear, however, from observation of drives and miscellaneous gears in the field that the standard of accuracy has greatly advanced and that 1 diametral pitch gears now have only about 0.001 or 0.002 in. inaccuracies of contour and division, which is about the best obtained with 3-pitch gears ten years ago. It can be further stated that the shaped gear is more valuable for universal application than the hobbed gear, because of the continuous form of tooth. Unquestionably, the continuous tooth is an advantage in mill pinions, because of the saving of bearing face, and the increased resistance to bending and torsion; the same advantages apply to all pinions of small diameter, and to gears of narrow face.

Theoretically, the shaped gear should be more accurate because actual running conditions between pinion and gear are more nearly resembled during the generation. The shaper method employs a master pinion cutter which is itself an original gear, so that identical conditions are obtained between cutter and blank as between pinion and gear, but the gear generated by a hob seldom meshes with a single helical pinion with its axis inclined to the gear. It is also to be noted that the shaping process is a later development of the art than the hobbing process, as the hobbing process was of forming.



Recommended Design of Reduction Unit

One of the accompanying illustrations (Fig. 1) shows a typical double-reduction high-speed turbine gear with 30 deg. angle. The pitch of these gears is very fine considering the commonly accepted practice for mill work and it will be noticed that the general design is different from that in general use in mill work; that is to say, the first reduction gears are made in one piece and the low-speed gears are divided into two sections. General mill practice is to make the high-speed gears in two sections and the low-speed gears in one piece. It is difficult to account for this latter type of design. It is obviously more easy to make gears accurate when made in one piece and it is the high-speed set which requires most of the care. The loads on the intermediate shaft with the type of design illustrated are heaviest at the ends where there is proper support from the bearings and the load in the center of the shaft is very light. On the other hand, there is an exact reversal of conditions with the standard mill-type drive. Presumably this design has been most commonly used because of the convenience of distributing the flywheel loads, but it is really quite a simple matter to apply flywheels in either case in satisfactory manner and there are so many advantages with the design illustrated that it should be more popularly used than it is at present.

Increasing Pinion Addendum

A wide variation in load-carrying capacity may be obtained with the proper selection of tooth proportions.

Reduction Gear Units ▲ ▲ ▲

It is often possible to quadruple the capacity of a set of gears generally described as standard by making the working depth, pressure angle and helix angle to suit each particular condition. Generally most gears do not require special depth, but practically all gears are better with uneven addenda between pinion and gear.

Fig. 2 shows a pair of gears with 19 and 90 teeth meshing on standard centers. Fig. 3 shows similar gears with increased pinion addendum and Fig. 4, gears of exactly similar teeth pitch and pressure angle but with the whole working depth of the teeth above the pitch circle of the pinion and the gear with an outside diameter equal to the pitch diameter.

It will be seen that in the first case the approach contact and recess contact are about equal, but from the second and third diagrams that the approach contact decreases and the recess contact increases as the addendum of the pinion is increased, until, in the third case all contact is recess. During approach contact the teeth are moving against each other and during recess they are moving away from each other so that it has been generally considered that there is more friction during approach than recess and, therefore, gears with the greatest recess contact are the most efficient. There are two other changes that occur with this increase in diameter that are not so apparent. The base circle remains constant in each case so that the same involute is used, but as the diameter increases a different section of the curve is used, and it will be noted that the average radius of the curve increases with the diameter. Consequently, pinions with increased addenda have greater resistance to pressure than standard pinions.

A comparison between Figs. 2 and 4 shows the average radius of the pinions to have been doubled while the gear contour is unchanged, so that if it is assumed that gear teeth are similar to two cylinders under pressure the gears in Fig. 4 are capable of carrying almost twice the load of those in Fig. 2. Another change in tooth action occurs with the gears in Fig. 4. It will be seen that the tooth contact commences at the line of centers and is all in recess. The teeth are, therefore, during all the period of contact, moving away from each other so that, since the direction is constant, the oil film is maintained.

Materials of the Gears

It is generally best to use ordinary cast steel (about 0.35 per cent carbon) for the gear and either a high-carbon (0.5 to 0.6 per cent carbon) forging or alloy steel forging for the pinion. It has latterly become almost universal practice to use an alloy pin-

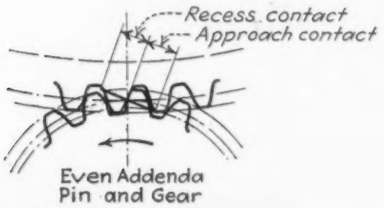


Fig. 2—Pair of gears of 19 and 90 teeth mesh on standard centers.

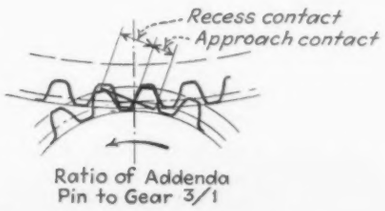


Fig. 3—Gears similar to those of Fig. 2 but with increased pinion addendum.

Fig. 4—Addendum of pinion has been increased until all contact is in recess.

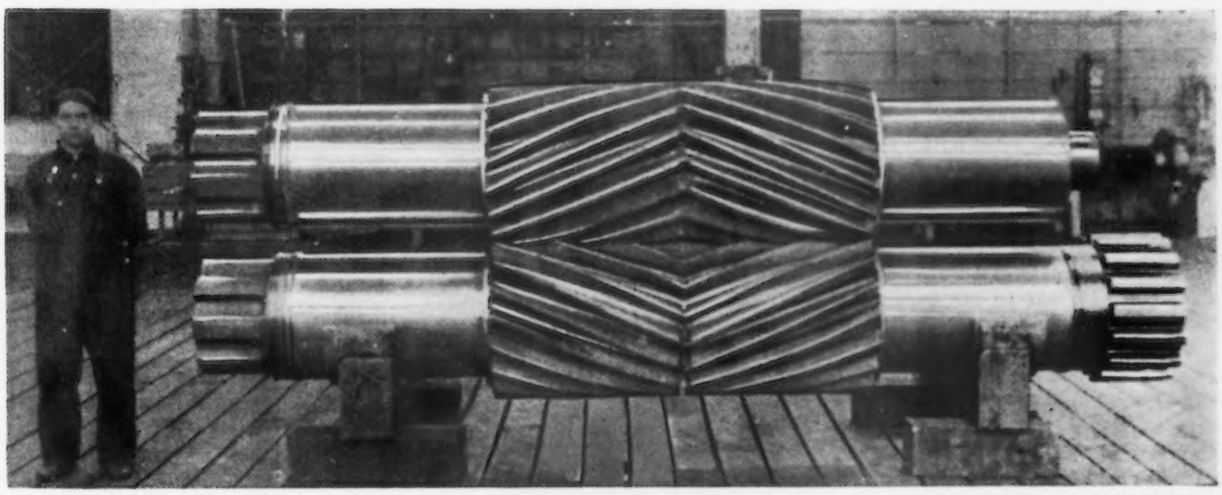


Fig. 5—Pinions for a 96-in. continuous strip mill were hardened to 475 Brinell by means of the oxyacetylene torch.

ion heat-treated and tempered. If this practice is followed there is the possibility of increasing the horsepower capacity by changing the gears to harder materials without any change to the case, but if the hardest materials obtainable are used at the outset any increase in load means a completely new unit.

Hardened Materials Essential

There are many places in a mill, however, where local conditions restrict the space available and hardened materials are essential. For a long time the best practice for high-speed gears operating under heavy loads was to make the pinions of a good alloy (SAE 3145 and SAE 6145 were most commonly employed), quenched and tempered to the limit of machinability (about 275 Brinell) and to make the gears of high-carbon nickel alloy of about 220 Brinell. It was held that although it was possible to quench after complete machining and obtain a hardness of nearly 500 Brinell the resulting distortion caused the load to be taken on a few high spots where, of course, it became more concentrated, and the impact loads due to irregularities of alinement became greatly in excess of the normal loads. Also there was much noise and vibration.

This practice has now been improved. Mill pinions and even large gears subject to extremely high tooth pressures are made of ordinary carbon steels, are finished completely to correct contour and are then hardened without distortion to about 475 Brinell. The method employed is the local hardening of the tooth surfaces by means of an oxyacetylene torch, followed by a water quench. The heat is concentrated upon only a very small section of the tooth at one time and is fed slowly along the face, each section being quenched automatically as the torch traverses.

Surface Hardened by Oxyacetylene Torch

Fig. 5 shows two pinions used for driving a finishing four-high stand on a 96-in. continuous strip mill. The pinions have a pitch diameter of 25 in., 4.3633 in. circular pitch and 62¾-in. face. The teeth and splines were hardened to 475 Brinell. This method was originally used by Vickers, Ltd., in about 1910-13, but to the best of our knowledge, was not extensively used until the last ten years except on small gears. It is now a highly developed system. A torch with a number of nozzles is held on a traveling carriage and the tooth preheated, quenched and tempered automatically at a uniform rate.

Steel Containers for Food Products Replace Wooden Barrels

THE manufacture of steel containers for food products has provided a new field for flat rolled steel and offers possibilities of a considerable volume of steel business. Wooden barrels have been generally used as containers for many food products and it is stated that the requirements of food industries that could use steel instead of wooden barrels amount to 4,000,000 to 5,000,000 barrels per year.

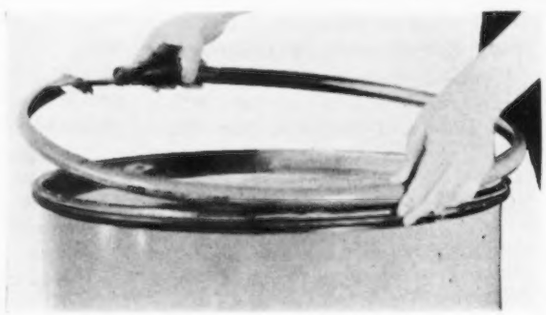
The National Steel Barrel Co., Cleveland, recently began the manufacture of steel containers for food products. This company developed for that use a barrel with a removable head, which is held in place by a patented lever-type locking ring, making the barrel easy to seal and to open without the use of tools. A flange in the head fits snugly against the chime of the barrel. After the head is placed on the barrel the ring is set on the head and expanded by means of a lever so that the head is firmly gripped to the barrel. To open the barrel the lever is pulled, the ring is removed and the head is lifted out.

The barrel shell, head and bottom, are made of 18-gage annealed sheet steel and the locking ring is formed of 12-gage material. The longitudinal seam in the shell is welded and the bottom is pressed in place. Two rolling hoops are pressed into the shell.

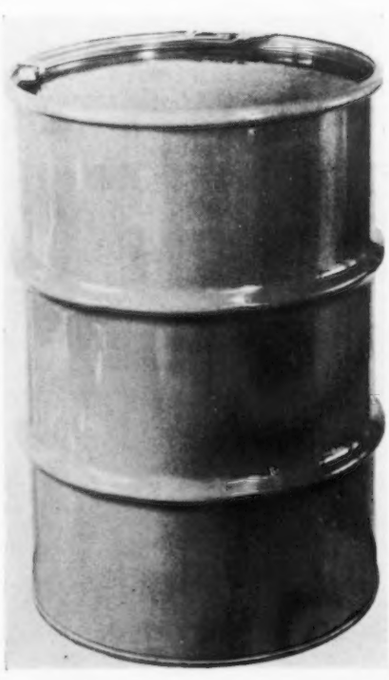
A special lacquer is used for lining the barrel. This gives the interior an enamel-like finish and is said to insure the contents against danger of contamination. The lacquer is sprayed on and then baked for 30 min. at 400 deg. F. in a gas-fired conveyor oven. The oven is provided with an air circulating system that forces the heated atmosphere through the inside of the barrel. After the interior coating is baked on, the outside is painted in whatever color the customer desires and this coating is dried in another oven.

Advantages claimed for this metal container, in addition to ease in sealing and opening, are that it is airtight, the contents are kept clean, there are no splinters to get mixed in the contents and there is no leakage, absorption or contamination. The containers are easy to fill, filling being done through the top instead of through the bunghole as in the case of wooden barrels. They weigh 20 per cent less than wooden barrels and they form convenient receptacles for storage after being emptied of their original contents.

The barrels are being made in sizes of from 25 to 60 gal. They are being used as shipping containers for lard, shortening, condensed milk, bakers' malt, syrups, molasses, sugar and other food products.



The steel container weighs 20 per cent less than a wooden barrel of the same capacity, and is easily opened and closed by a patented lever-type locking ring.

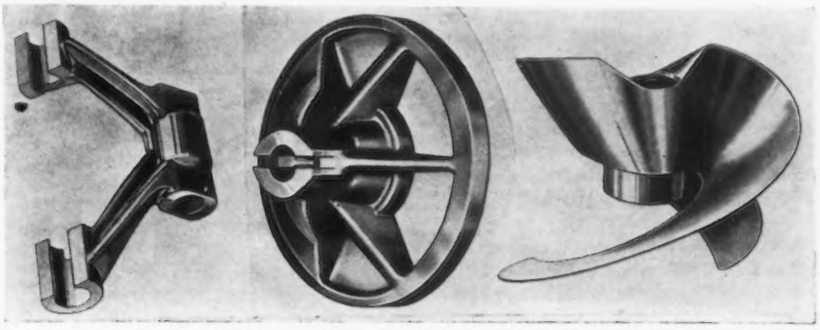


National Steel Corporation has declared the regular quarterly dividend of 25c. a share on the common stock outstanding, payable Jan. 30, 1934, to stockholders of record Jan. 20, 1934.

Aluminum Bronze Improved By Vacuum Die Casting

FOR many years, mechanical designers have recognized that aluminum bronze may possess an extraordinarily valuable combination of qualities—tensile strength, a hardness suited to many present-day products, high resistance to abrasion, and a particularly effective resistance to corrosion under a wide range of adverse conditions.

In spite of this array of valuable qualities and the desire on the part of designing engineers to make more extensive use of these qualities, they have been hampered by the fact that the technique of producing and fabricating aluminum bronze commercially has proved elusive. When handled according to older methods, the alloy has all too frequently failed to display a dependable uniformity under prolonged quantity tests. Aluminum bronze castings have been made in sand and in permanent molds for many years. In both of these methods, it has been difficult, if not impossible, to avoid the inclusion of the aluminum oxide which forms on the surface of the molten metal with extreme rapidity. The inclusion of this oxide has been one of the main factors in retarding the extensive use of aluminum bronze.



Intricate parts are now successfully die cast in aluminum bronze.

The Aurora Metal Co., Aurora, Ill., has now developed a vacuum die casting process by which aluminum bronze is being produced in quantity. After having used this method for several years, the company claims that parts, so made, are uniform in composition, strength, hardness, and heat-resisting properties and are free from inclusions of aluminum oxide.

Eliminates Aluminum Oxide

In the vacuum process, molten aluminum bronze is drawn by vacuum into a steel die from below the surface of the metal. The metal rises into the die in a smooth, continuous flow without the effect of nozzling, spraying, or pouring. The level of the molten metal simply rises until the die is filled. The aluminum oxide, which forms on the advancing surface of the metal, is deposited in a thin film upon the walls of the die cavity. Thus, a casting is obtained which is entirely devoid within its body metal of the element which has minimized the commercial usefulness of aluminum bronze for so long.

In this process, the flow of metal into the die is maintained until the entire casting solidifies. This action eliminates the porosity (shrink holes) heretofore associated in general practice with die castings in even the more easily handled white metals. The dies, often intricately formed, are said to be filled sharply at the edges, resulting in clean and smooth surfaces of the castings.

Accuracy, in general, exceeds one half of one per cent of the linear dimensions. Considerably greater accuracy may be obtained on specific dimensions where these are important.

Castings which vary from 200 to a lb., up to 30 lb. each, are being produced commercially. These sizes do not, however, represent the limits of practicability, according to the company's engineers. They state that no ultimate size limitation has yet been encountered.

The cost of aluminum bronze die castings, produced by the vacuum method, somewhat exceeds, at present, the cost of white metal die castings, brass castings, forgings, and screw machine products which require little machine work to bring them into final shape. Present experience seems to indicate that aluminum bronze vacuum die castings show more outstanding advantages when used for parts requiring great strength and permanence of material (resistance to corrosion, abrasion, and fatigue) and where their use will eliminate expensive machine work that would be necessary if the same part were made of other material and by some other process.

Timken Issues Impressive Data Book

A NEW 266-page loose leaf book of general information on the various types of Timken bearings has just been released. It differs materially from previous editions since new load ratings have been established conforming to the fatigue life of the bearings. An explanation of these ratings along with the methods of calculating loads and selecting bearings comprises one section.

This is followed by a statistical presentation of the bearings available in the various types. These tables have been arranged uniformly by cone bore with the smallest bores shown first. In the single row group are included the standard or conventional bearings, the tapered bore, steep angle, keyway cone, flanged cup, S.A.E. standard and airplane series. The two row assemblies include the two-row self-contained bearings; the two-row double cone, single cups, both in the wide and narrow series. In the same group will be found the tapered bore cones, with and without pullers and the slotted cone bearing. Following the last named unit are the double cup bearings, that is, the assemblies in which two standard cones are assembled into a double cup to form a unit, and the N. A. group. Both of these are divided into the regular and steep angle series. Another tabulation appears here, consisting of a type of bearing very similar to the N. A. assemblies; the cone, however, consists of a single piece, the cups being held apart and the correct bearing setup maintained through the use of a split spacer ring inserted between the cups. With this spacer in place the entire assembly becomes a complete unit.

The four row group consists of two tabulations, those with cone spacer pilots and those without. The former is recommended for those applications which require a loosely fitted cone on the shaft and the latter those with a tight fit.

Following the tabulations just indicated will be found the "T" types or flat thrust bearings and the steering gear type bearings.

The next two hundred-odd pages

comprise dimension sheet section. The illustrations in this division are to scale and accurate to 0.01 in. This permits the draftsman to use them to trace the bearing in the proper position on his drawing either in full or half size, as both sizes are given.

In the application of Timken Bearings certain miscellaneous parts are frequently needed and the section immediately following the Dimension Sheets covers shims, nuts, tubes, washers and cotter pins.

The success of a Timken Bearing application depends, not only on the selection of the proper bearing but also on the observance of certain basic principles. These are covered thoroughly in the section on mounting. Shaft and housing design, typical mountings of single, double and quadruple assemblies, closures, fitting tolerances for both cups and cones, and other data conclude the book.

British Iron Output Higher—Steel Drops

LONDON, ENGLAND, Jan. 22 (*By Cable*).—Steel ingot production in the United Kingdom amounted to 668,900 tons during December, a slight decline from the 695,000 tons produced in the preceding month, but much higher than the 430,400 tons reported in December, 1932. British steel ingot production in the past year was 7,002,800 tons, compared with 5,247,400 in 1932.

British pig iron output in December rose to 409,300 tons, the highest monthly total in more than two years. November production was 374,900, while 284,500 tons was produced in December, 1932. In the full year, 1933, Great Britain produced 4,123,600 tons of iron, compared with 3,569,900 in 1932.

Monthly totals for 1932 and 1933 are shown in the following table:

1932	Pig Iron	Steel Ingots
Jan.	332,400	429,700
Feb.	318,100	480,600
March	335,600	462,800
April	316,900	433,300
May	315,300	416,900
June	311,400	459,300
July	292,600	430,300
Aug.	259,400	361,500
Sept.	260,400	430,300
Oct.	275,600	438,500
Nov.	267,700	473,800
Dec.	284,500	430,400
	3,569,900	5,247,400
1933		
Jan.	286,600	444,400
Feb.	270,800	482,700
March	332,200	577,700
April	324,700	509,600
May	339,900	599,600
June	345,600	568,800
July	343,900	567,500
Aug.	362,700	551,300
Sept.	359,700	669,000
Oct.	373,300	668,300
Nov.	374,900	695,000
Dec.	409,300	668,900
	4,123,600	7,002,800

Iron Ore Mined in 1933 Registered 78 Per Cent Increase Over 1932

IRON ore mined in the United States in 1933, exclusive of ore that contained five per cent or more of manganese in the natural state, is estimated by the Bureau of Mines at 17,511,000 gross tons, an increase of 78 per cent over 1932. Ore shipped from the mines in 1933 is estimated at 24,608,000 gross tons, valued at $63,744,000, an increase of 362 per cent in quantity and of 394 per cent in total value compared with 1932. Compared with the five-year average for 1928 to 1932, which amounted to 45,616,803 tons valued at $117,115,655, the 1933 shipments showed a decrease of 46 per cent in both quantity and value.

The average value of the ore per gross ton at the mines in 1933 is estimated at $2.59; in 1932 it was $2.42. This increase is partly explained by the large proportionate gain in tonnage of the high valued Lake Superior ores that in 1933 accounted for 87 per cent of the nation's total as compared with 67 per cent in 1932. The stocks of iron ore at the mines, mainly in Michigan and Minnesota, decreased 38 per cent from 17,603,873 gross tons in 1932 to 10,944,000 tons in 1933.

About 87 per cent of the iron ore shipped in 1933 came from the Lake Superior district, in which approximately 14,594,000 gross tons was mined and 21,510,000 tons shipped, increases of 79 and 501 per cent respectively compared with the quantities mined and shipped in 1932. The ore shipped in 1933 was valued at the mines at $58,474,000, an increase of 492 per cent. These totals include the ore shipped by rail as well as by water from all mines, but exclude manganiferous ores amounting to approximately 204,000 gross tons in 1933 and 10,981 tons in 1932.

The southeastern States, in which the Birmingham district is the largest iron-ore producing area, mined approximately 2,138,000 gross tons of iron ore in 1933, an increase of 52 per cent compared with 1932. Shipments from mines in these States in 1933 amounted to 2,158,000 gross tons, valued at $3,239,000, increases of 44 and 29 per cent respectively in quantity and value compared with 1932.

December Construction Awards Best Since 1931

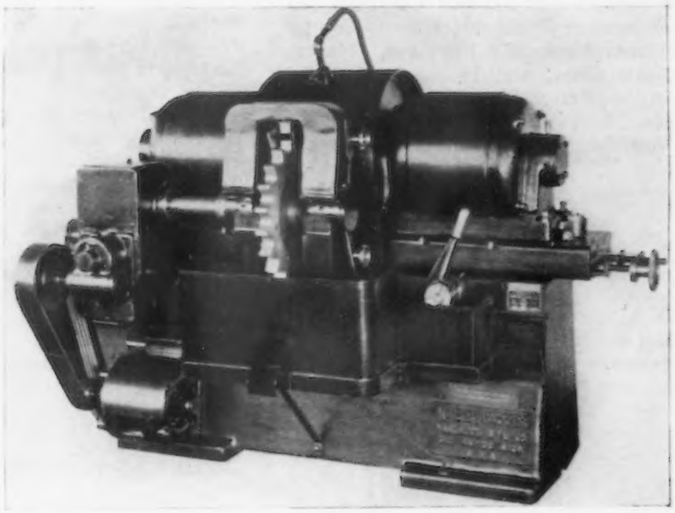
CONSTRUCTION contracts reported in December by F. W. Dodge Corpn., covering the 37 eastern States amounted to $207,209,500. An increase of approximately 28 per cent over the November total which itself registered a gain of almost 12 per cent over October, the total for the final month of 1933 was larger than that recorded for any other month since October, 1931. Of the December contract total $155,862,800 was for publicly-financed construction.

Construction contracts awarded in the 37 states during all of 1933 amounted to $1,255,708,400, as contrasted with $1,351,158,700 for 1932, a decline of about 7 per cent. In the first half of 1933, contracts were running 35 per cent behind the corresponding period of 1932. During the final half of the year a considerable speeding up in contracts took place.

ESTIMATES OF IRON ORE MINED AND SHIPPED IN THE UNITED STATES IN 1933 AND ACTUAL OUTPUT IN 1932

	Ore Mined (Gross Tons)		Ore Shipped			
			1932		1933	
District	1932	1933	Gross Tons	Value	Gross Tons	Value
Lake Superior:						
Michigan	2,554,996	2,373,000	968,789	$2,703,900	6,104,000	$18,271,000
Minnesota	5,154,291	11,980,000	2,248,727	6,263,181	14,794,000	38,557,000
Wisconsin	430,140	241,000	360,037	905,601	612,000	1,646,000
Total	8,139,427	14,594,000	3,577,553	$9,872,682	21,510,000	$58,474,000
Southeastern States:						
Alabama	1,374,534	2,112,000	1,470,445	$2,428,227	2,133,400	$3,189,900
Georgia	925	1,300	925	1,526	300	500
Missouri	29,797	400	25,418	72,144	.....	.....
Tennessee	.....	24,000	.....	.....	24,000	48,000
Virginia	.....	300	.....	.....	300	600
Total	1,405,256	2,138,000	1,496,788	$2,501,897	2,158,000	$3,239,000
Northeastern States:						
New Jersey	30,844	74,000	14,966	$194,577	74,000	$825,000
New York	31,327	61,000	30,600		162,000	
Pennsylvania	102,838	265,000	74,420	157,400	325,000	698,000
Total	165,009	400,000	119,986	$351,977	561,000	$1,523,000
Western States	137,224	379,000	136,874	$171,455	379,000	$508,000
Grand total	9,846,916	17,511,000	5,331,201	$12,898,011	24,608,000	$63,744,000

The machine at left grinds the ends of coil springs at the rate of 400 springs an hour. It has 14 automatic work-clamping fixtures, each of which holds two springs. The machine at right grinds both ends of coil springs simultaneously, production being at the rate of 30 per min.



Grinds Ends of Coil Springs For New Model Automobiles

FOR grinding the ends of coil springs used in the independent front wheel suspensions of new model automobiles, the Hanchett Mfg. Co., Big Rapids, Mich., has recently supplied the two machines here shown.

The larger unit, the company's No. 72 machine, is for grinding the ends of coil springs that are approximately 10 in. long, 3½ in. in diameter and are made of ¾-in. wire. Fourteen special automatic clamping fixtures of V-block type are positioned around the 72-in. diameter work-table. These fixtures are made in series. Every other vee is provided with a hardened plug at the bottom that is 1/16 in. longer than the plug in the adjoining vee. After one end of one spring has been ground, it is placed in the first vee, and accordingly the top ends of two springs in each fixture lie in the same grinding plane. Once the machine is in operation, by reversing every other spring, the operator is enabled to take from the machine 14 springs ground on both sides for every revolution of the table. Approximately 1/16 in. of stock is removed from each end of the springs, and production of 400 springs an hour is obtained. This machine is fitted with three 25-hp. motor-driven vertical grinding heads. Each end of each spring is acted upon three times while passing under these three grinding members. The complete machine weighs 32,000 lb.

The second grinder illustrated is a No. 221 double-spindle Badger grinder used for grinding both ends of coil springs simultaneously. These springs are 2¼ in. in diameter, 2 in. long and are made of 7/16-in. wire. A rotary carrier having a series of notches around the periphery travels between the two 24-in. grinding disks. A shoe positioned between the grinding disks surrounds this carrier plate and holds the springs in the notches. The operator feeds the rough springs into carrier plate at the top, and the springs are ground on both ends at the rate of 30 per min. This machine weighs 8500 lb., complete.

Multi-Speed Reducer has Constant-Speed Motor

A MULTI-SPEED reducer designed to give both a variation in speed and a reduction in speed has been added to the line of Planigressive speed reducers manufactured by the Davis & Thompson Co., Milwaukee. It makes possible the use of a constant-speed instead of a multi-speed type of motor, and gives the exact speed required.

Multi-speed reducer with constant-speed motor designed to give variation as well as reduction in speed.

The reduction in speed is obtained through planetary gears. Composition gears are employed to assure quiet operation. Gears run on bearings of generous size supported on both sides in a one-piece planet cage which is carried on ball bearings. Lubrication is provided by a supply of oil in the base into which the gears dip and carry oil to all parts that require lubrication.

To change the speed it is only necessary to shift a lever, and speed changes can be made while the reducer is running with or without load or with the reducer stopped. The reducer can be run in either direction without change or adjustment.

These multi-speed reducers are built in sizes ranging from ¾ to 10 hp. Practically any combination of ratios from 3:1 to 7:1 can be furnished; this in conjunction with other reductions will give a wide speed range, and also reductions up to 600 to 1 and higher. These reducers are being distributed by the Planigressive Reducer Sales Co., Milwaukee.

The Central Iron & Steel Co., Harrisburg, Pa., has appointed Theodore Geissmann & Co., Inc., 180 North Michigan Avenue, Chicago, district sales agents for its products in Illinois, Indiana, Wisconsin, Minnesota, Iowa, Missouri with the exception of St. Louis, and Omaha, Neb. The Central company has also appointed Potter & Duggan, Inc., Court and Wilkeson streets, Buffalo, district sales manager in New York State west of Schenectady and in Erie and Bradford, Pa. The Central company manufactures plates of all kinds, hot-rolled annealed sheets, billets, slabs, blooms and kindred products.

Develops Desk-Type Profile Projector

A NEW form of projector for checking small articles has been announced by the Société Genevoise d'Instruments de Physique, Geneva, Switzerland, and is being marketed in the United States and Canada by the R. Y. Ferner Co., Investment Building, Washington. It differs from

other profile projectors in that the image is thrown from below on to the upper surface of a heavy glass plate set in the top of a steel cabinet. The plate is inclined at an angle so that the operator can look directly at the projection and without the shadow of his head or hands interfering with study or measurements of the image.

This construction and the convenience of mounting small articles on a small table below the projection condenser adapts the equipment to a wide variety of uses, including comparing the profile of screw threads and gears with their theoretical cross section, and checking parts of watches, clocks, typewriters, firearms, cutting tools, profile cutters, screw rolling dies and other small parts. Because of the table construction, the device can also be used for drawing of parts for which drawings are not available.

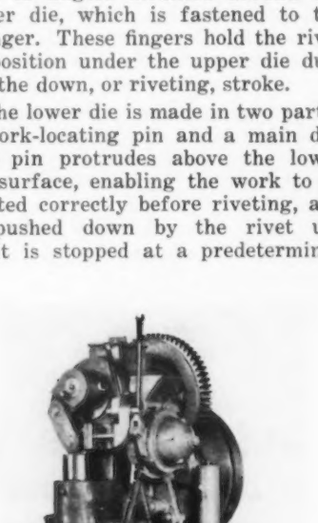
The glass screen on which the image is projected measures 12½ x 15¾ in. Magnifications may be either 10, 20, 50 or 100x. Change of amplification is made merely by pushing the new objective into place. The table on which articles are placed consists of a glass plate 2⅜ in. in diameter which can be rotated and is adjustable for centering of the object. The image can be quickly brought to coincidence with reference marks or the outline on the tracing paper or cloth applied to the screen. The table is also adjustable in height, and may be clamped to prevent any displacement.

Illumination is furnished by an electric lamp, and a black curtain supported by a steel frame makes it possible to use the instrument in daylight. It is said that tracing paper or cloth laid on the glass panel of the table reveals the image with enough sharpness so that 0.005 or 0.01 in. can be measured, which, with 100x magnification, corresponds to 0.00005 or 0.0001 in. on the object. Glass scales are furnished for checking purposes. The equipment occupies floor space of 3 ft. 9 in. by 4 ft. and is 6 ft. 2 in. high.

Hydro-Mechanical Squeeze Riveter

AN arrangement for automatic feeding of rivets is incorporated in the mechanical squeeze riveter here illustrated, which is being offered by Norin Engineering Co., 355 North Union Park Court, Chicago. The rivets are fed from a hopper to a pair of fingers mounted around the upper die, which is fastened to the plunger. These fingers hold the rivet in position under the upper die during the down, or riveting, stroke.

The lower die is made in two parts: a work-locating pin and a main die. The pin protrudes above the lower die surface, enabling the work to be located correctly before riveting, and is pushed down by the rivet until it is stopped at a predetermined height, in which position it forms a part of the lower die. A work-closing arrangement is also provided to assure closeness between the parts to be riveted before the actual riveting takes place.



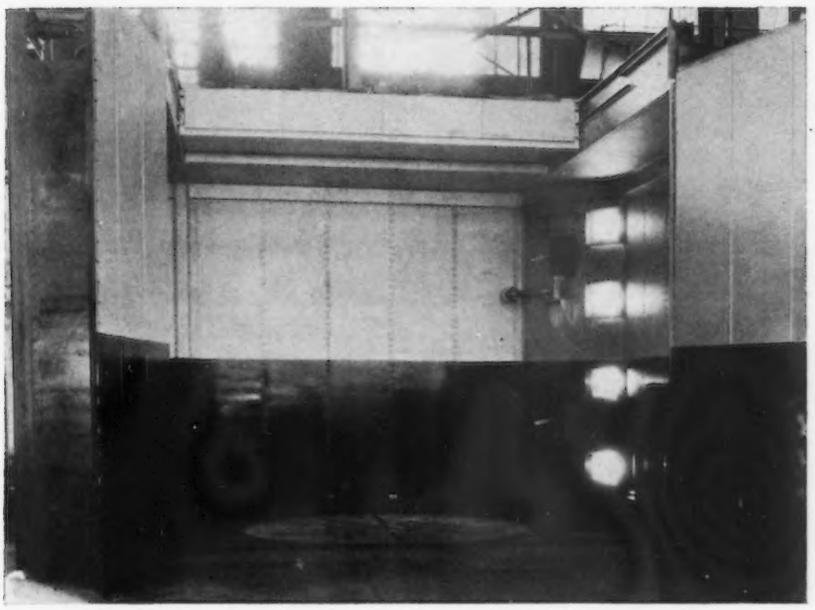
Riveter mechanism is of the hydro-mechanical type which has complete flexibility. Even if the plunger should be blocked in its upper position, the crank may be rotated around continuously without injury or overloading of any part. A long, uniform-pressure stroke, usually one-third of the length of plunger stroke, allows rivets to be driven in different thicknesses of material without any change in dies or adjustment. The tonnage may be adjusted at will. The machine will squeeze 3/16 in. solid iron rivets. It is equipped with a ½-hp. motor.

Excess Temperature Cut-Out Safeguards Charge

AN excess temperature cut-out that safeguards the charge against overheating as well as protecting the equipment is being marketed by the Hevi Duty Electric Co., Milwaukee. This device, which is adaptable to all types of heating equipment—gas, oil,

and electric—may be set to cut out a few degrees above the normal operating temperature of the equipment.

A separate thermocouple located in the heating chamber operates the cut-out control relay. This relay is connected to form part of the main heating control circuit. An adjustable target is provided for setting the instrument at any desired kick-out temperature. As soon as the temperature rises to that of the target setting, the control circuit is opened and the heat source thereby cut off. Failure of the thermocouple circuit of the cut-out opens the control circuit. The cut-out can also be connected to flash a light or sound an alarm, or both, when excess temperature is reached.



Steel Castings Cleaned By Washing

STEEL castings ranging in size from small gears to large frames weighing as much as 15 tons are cleaned by water under 300 to 400 lb. pressure at the South Milwaukee plant of the Bucyrus-Erie Co. Previously the core sand, core rods and gaggers were removed by means of pneumatically-operated pokeout bars, a crew of men being employed in this work. With the washing equipment the same work is done by three men, namely a craneman, hookman and washer room operator. The washing eliminates all dust and dirt, and saves a great deal of time, a 15-ton casting that previously required about 35 hr. to clean now being finished, for example, in 1½ to 2 hr.

The castings washer, designed and built by the Pangborn Corpn., Hagerstown, Md., and recently installed, consists of a steel room 25 ft. square on the inside and 17¾ ft. high, overall. It is provided with two 15 x 16 ft. hydraulically-operated doors at the front and a three-panel sliding type door at the top to permit a traveling crane to place the work on the turntable in the center of the room. The door in the top is driven by a 5-hp. motor mounted on the front panel.

The rotating table in the center of the room is 12 ft. in diameter and has capacity for 50 tons. It is provided with T-slots and with holes for stanchions, chains, etc. Driven by a 10-hp. waterproof motor, it may be rotated in either direction to permit the stream to hit at any angle. There are two operating stations, located one above the other at a corner of the room. Shatter-proof windows directly above the nozzles permit the operator to see the work and direct the nozzles wherever required. At both stations the operator has control of the water pump, work table movement nozzles, and the interior lights. The water employed in the washing process is reused again and again.

"Junior" Melting Pot

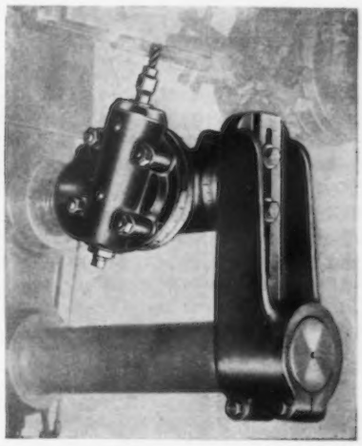
A "JUNIOR" portable electric solder and melting pot designed to heat rapidly and to closely maintain operating temperature has been placed on the market by the Newton Junior Corpn., 151 Court Street, New Haven, Conn. The pot will keep in molten condition all metals or materials with melting points as high as those of tin and solder, and is suitable for tinning or dipping and for hardening of small tools.

When filled to capacity, namely, 4 lb., the melting period of the pot is about 20 min. Heat is said to be applied to 80 per cent of the possible heating area, and thorough insulation is a feature emphasized. Current consumption at maximum capacity is 275 watts. Molten metal cannot enter the heating chamber, and terminals are guarded from overflow or dripping of metal. The shipping weight of the pot is 6 lb.

High-Speed Universal Milling Attachment

FOR power-feed milling machines, the Porter-Cable Machine Co., Syracuse, N. Y., has brought out the universal, high-speed attachment illustrated. It is offered for use in tool rooms, job shops and manufacturing plants for such awkward operations as milling internal or external cams, boring holes in jigs and fixtures without changing position of the work, milling drafts on patterns; also radius, angular, T-slotting and experimental work.

The universal head operates on any angle in any plane, and, regardless of the position of the cutter, the attachment is held rigidly by the overarm clamp. Preloaded precision bearings that take both thrust and radial loads are employed throughout. All bearings and gears are inclosed and run in oil.



The universal head of this high-speed attachment for milling machines will operate at any angle in any plane.

This new milling attachment, designated as the No. 6, is driven by the spindle of the milling machine and provides a spindle speed of 2 1/3 times that of the machine spindle. Adaptable to any make of single or double overarm milling machine, it is furnished with either a No. 9, 10 or 11 B & S taper drive arbor. The spindle of the attachment itself has a No. 7 B & S taper. For holding small end mills, a split draw-in collet can be furnished.

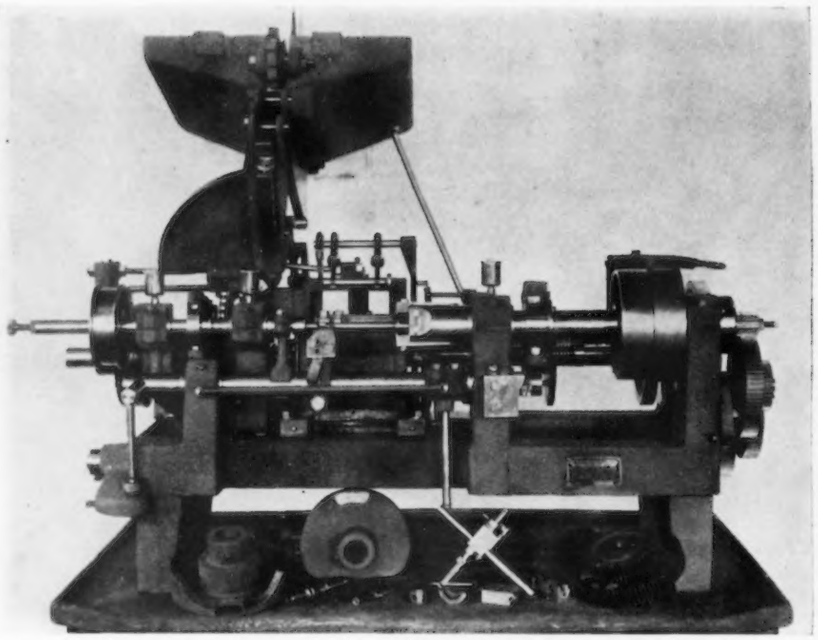
Pointing, Shaving, and Drilling Machine

FOR drilling, pointing, forming or shaving operations on either end of previously formed blanks, either headed or produced on standard screw machines, the H. P. Townsend Mfg. Co., Hartford, Conn., is offering the new machine here illustrated. This machine is adapted for light cuts and high production and is built in three sizes. The No. 3 will handle blanks up to 5 in. long by ⅝ in. in diameter, and production on the smaller blanks is as high as 60 per min. Tubes and shells can also be handled for trimming, rolling or knurling operations.

The hopper feed can be arranged to handle a large variety of work besides ordinary screw blanks. The blanks are picked up by the "rise-and-fall" hopper blade and passed down a short, straight track to a carrier segment which takes them over in line with the feed fingers. The latter carry the blank down in line with the spindle and move sideways to insert it in the jaws. The forming tool and drill are brought up to the work to operate together or independently. The work revolves in one direction and the drill in the opposite direction, so that high spindle speeds are not necessary. The work is supported by a back rest which also provides for centering the drill by a bushing.

Cams that operate the drill and forming tool, one for each, may be changed quickly, as they are mounted on the end of the camshaft outside the bearing. Change gears give a wide range of spindle speeds.

Normally the work is fed with the head toward the chuck, but it may be fed with the head away from the chuck by using a simple mechanism underneath the front spindle bearing in place of the plain feed fingers. With this the blank is picked up in the normal position, but as the fingers bring it down in line with the spindles it is turned end for end so that operations can be performed on the head.



Either end of previously formed blanks can be rapidly drilled, pointed, formed or shaved. Tubes and shells can be handled, and a number of modifications of the machine can be furnished.

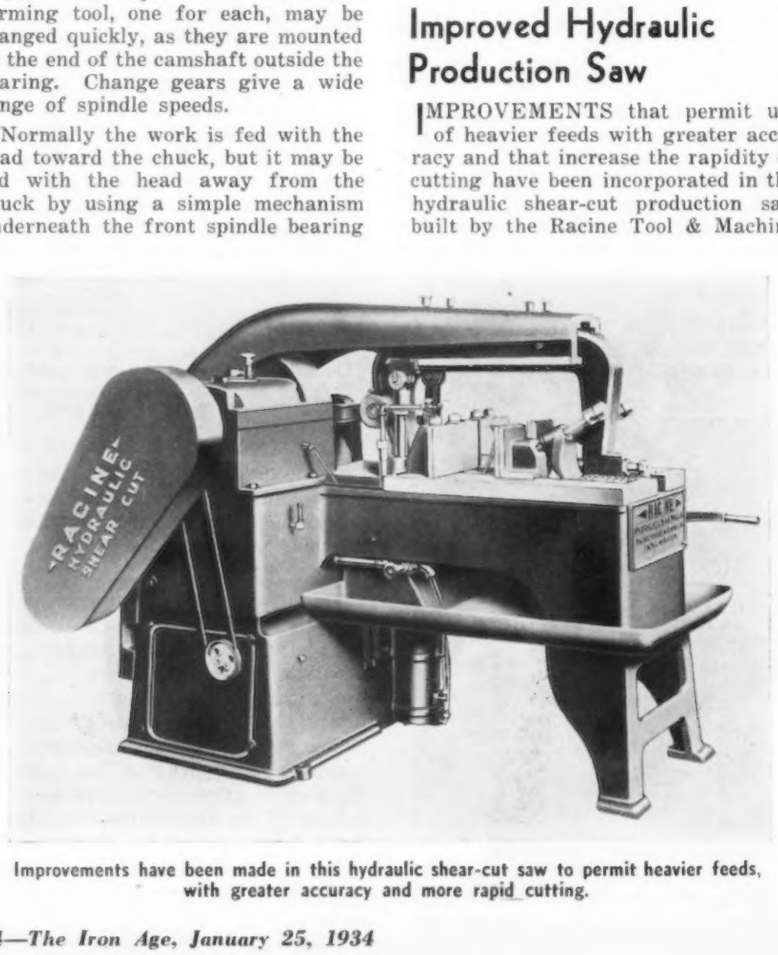
Improved Hydraulic Production Saw

IMPROVEMENTS that permit use of heavier feeds with greater accuracy and that increase the rapidity of cutting have been incorporated in the hydraulic shear-cut production saw built by the Racine Tool & Machine Co., Racine, Wis. As stated in the description of the former model in THE IRON AGE of April 23, 1931, hydraulic operation of feed, lift, clutch and rapid traverse, and complete control through a single lever, are features of these machines.

The saw guide and saw frame now slide in ways that extend on each side of the frame, the latter being thus widely supported on each side instead of only at the top. Adjustment is provided by two gibs on each lower bearing surface and one side gib. Connection between the saw guide and the main hydraulic cylinder is now accomplished by means of two tension rods on each side of the frame. These extend down through the table and are attached to the piston rod by means of a cross-member, to which the piston rod is attached in the center. With this construction the hydraulic feeding pressure is applied directly under the center of the blade.

The saw frame is of entirely new construction, having ways bolted entirely through the frame on each side. This arrangement is said to permit heavy tension on the saw blade without affecting the accuracy or alinement of the side plates due to any distortion of the frame. It is emphasized as a marked improvement over the one-piece frame construction formerly employed.

The hydraulic pumping unit is now located inside of the oil reservoir, where it runs in oil. The variable volume feature of the pump as well as the pressure are controlled by an automatic governor. In addition to the 10 x 10-in., 12 x 12-in. and 10 x 16-in. shear cut production saws, special sizes of 13 x 13 in. and 13 x 16 in. are now available. Three machines were shipped recently to Vatican City.



Improvements have been made in this hydraulic shear-cut saw to permit heavier feeds, with greater accuracy and more rapid cutting.

THE NEWS OF THIS WEEK

Scrap Iron and Steel Industry Elects Code Authority—End of Direct Dealing Promised

REORGANIZATION of the scrap iron industry to function as a unit under the "new deal" was accomplished at the annual convention of the Institute of Scrap Iron and Steel held in Atlantic City, N. J., Jan. 17 and 18. With the industry's code awaiting the signature of the President, following months of careful planning, a code authority consisting of eight members of the industry was elected at the convention. The active continuation of the institute was assured with the reelection of Benjamin Schwartz as director general for the ensuing year. As a final promise of a new deal for the industry, J. J. Connelly, executive assistant to the division administrator of the particular branch of the NRA under which the scrap iron code has been placed, addressed the members of the institute at their annual banquet and promised the full cooperation of the Federal Government in the administration of the code of fair competition.

Of more than usual interest was Mr. Connelly's statement that if the industry continued its organization along present lines with the promise of a thorough adherence to its code of fair competition, a speedy solution to the problem of direct dealing which has hampered the industry for years would surely be found. Just what this solution would be Mr. Connelly did not specify, but his complete understanding of the difficulties which have faced the scrap industry during the depression and before gave renewed hope to all of those present at the convention.

Scrap Iron Shortage Threatened

While the greater part of the convention was devoted to the discussion of the code and organization under it, Lewis B. Lindemuth, New York consulting engineer, brought interesting economic conjecture to the members of the industry in a paper on the probability of a scarcity of scrap iron and steel in the not far distant future. Mr. Lindemuth's ideas on this subject were incorporated in an article appearing in THE IRON AGE of June 22, 1933, page 988.

Code Authority Chosen

A code authority, consisting of eight outstanding members of the industry who represent the various important scrap consuming and producing districts of the country, was elected by secret ballot at the afternoon session, Jan. 17. The following were named: Joel Claster, Luria Brothers & Co., Reading, Pa.; Dan R. Cohen, D. R. & F. A. Cohen, Chicago; Darwin Luntz, Luntz Iron & Steel Co., Canton, Ohio; Michael V. Bonomo, L. Schiavone & Bonomo Brothers, Jersey City; Ben P. Williams, Hickman, Williams & Co., St. Louis; Charles Dreifus, Charles Dreifus Co., Pittsburgh; Joseph V. Kiley, T. J. Kiley & Son, Boston, and Dan Roblin, Buffalo Housewrecking & Salvage Co., Buffalo.

Herman D. Muskowitz, retiring president of the institute, also delivered his farewell address in that capacity. Having served as president for the past two and a half years and especially during the trying period of codification, he had earned an expression of deep gratitude from the members assembled. Mr. Muskowitz emphasized the great possibilities which lie ahead of the industry under the NRA and urged the full cooperation of the members of the institute in carrying out its purposes.

Officers Elected

Joel Claster, Luria Brothers & Co., Reading, Pa., was elected president of the institute at a meeting of the board of directors held on Jan. 18. Other officers elected include five vice-presidents as follows: D. H. Cohen, D. H. Cohen, Inc., St. Louis; Darwin Luntz, Luntz Iron & Steel Co., Canton, Ohio; Harry Silverstein, Midwest Steel Corpn., Charleston, W. Va.; Barney Rubine, Hudson Iron & Metal Co., Bayonne, N. J.; Ben Cohen, Louis Cohen & Son, Wilkes-Barre, Pa. Walter Erman, Erman-Howell & Co., Chicago, and Thomas F. Kelly, Brooklyn, were reelected secretary and treasurer respectively, and Philip W. Frieder, David J. Joseph Co., Youngstown, was reelected chairman of the board of directors.

Fabricated Metal Code Hearings

THE National Recovery Administration announces that a public hearing will be conducted, beginning at 10 a.m., Friday, Feb. 2, in the Chinese Room of the Mayflower Hotel, before Deputy Administrator H. O. King on five proposed supplemental codes of fair competition for as many divisions of the Fabricated Metal Products Manufacturing and Metal Finishing and Metal Coating Industry.

These are:

Galvanizing Manufacturing Industry
Machine Screw Manufacturing Industry
Machine Screw Nut Manufacturing Industry
Cap Screw Manufacturing Industry
Wood Screw Manufacturing Industry.

Each of these supplemental codes is offered by an association representing from 70 to 98 per cent of its industry. Each places its divisional industry under the approved master code for the fabricated metal products manufacturing and metal finishing and metal coating industry. Wage and hour provisions are in the master code. The supplemental codes, as proposed, establish fair trade practice rules, industry definitions, divisional code authorities and, in some cases, set-ups for prescribing minimum cost prices.

Two foreclosures have been filed whereby the 1929 Realty Corpn. takes over the real estate of the Palmer Steel Co., Chicopee, Mass., consisting of a manufacturing plant and other buildings and land on McKinstry Avenue.

Labor Chief Beneficiary of Steel Code, Says Tower

A SURVEY of the results and of the outlook shows that the most important commercial feature of the steel code is its provision for open prices, according to a statement made this Monday by W. S. Tower, Executive Secretary of the American Iron and Steel Institute.

"Without the open price provision of the steel code, the industry would be practically helpless in making any effective contribution to the Administration's recovery effort," said Mr. Tower. "This is true because conditions of fair competition and stable markets have been imposed in place of the disastrous market conditions which prevailed throughout the lean years.

"The first beneficiary of the steel code thus far has been labor. Most steel companies operated in the red in 1933 and without the prospect of stable markets, the industry could not possibly long continue to support the benefits to labor.

"From last June, the first month for which steel mill employment and payrolls were compiled in connection with the code, to November, the latest month for which figures are available, the direct outlay for wages, exclusive of salaries, by the steel industry showed an increase per ton of finished steel produced of 70 per cent.

"In June the approximate production of finished rolled steel was 1,870,000 tons and total wages, exclusive of salaries, to mill labor amounted to $24,434,000 or $13 a ton. In November output was approximately 1,110,000 tons of finished rolled steel and wages were $24,838,000 or $22 a ton.

"Thus with production down by 40 per cent, wage earners actually were paid $400,000 more in November than in June.

"The factor of smaller production also played a part in lifting the wage outlay per ton. In November, average hours of labor were about 27.8 per week as compared with 39.4 in June.

Volume Factor Less Powerful

"Before the code any considerable increase in volume of output would automatically cut down the wage outlay per ton. This will be less true henceforth because of the code restriction in respect to maximum hours and minimum wage. With a 70 per cent operation, it is estimated 125,000 more men would have to be added to steel mill payrolls.

"A great deal of misconception exists about steel prices. It is not generally realized that steel prices reached their post war peak in the spring of 1923. From that point there was an almost uninterrupted decline until the bottom was reached in the spring of 1933. From that time to the present there has been a relatively small advance in the average of steel prices, but less than the advance for general wholesale commodities which are now about 20 per cent above the low level of 1933.

"The second beneficiary of the steel code has been the consumer. Stable markets for steel are not only necessary to support the heavily added wage burden, but they are also of distinct benefit to consumers. The chief advantage to users of steel will be the banishment of speculation in prices, together with secret practices, which have long been prevalent in the steel industry.

"Under the steel code, there is one price basis for all users, as a result of which secret price concessions cannot put one user at a competitive disadvantage with another in the same line.

"The plain truth is that in past years much steel was sold on the basis of cut prices, the granting of easy credit terms and other concessions. This not only was destructive to normal profits in the steel industry but it injected a state of confusion throughout the trade and among consumers. Everyone was working in the dark, each hoping to gain a special edge over his competitor.

Prices Now Out in the Open

"The steel code has brought the whole price situation out into the open light of day. Members of the code are compelled to list their prices with the American Iron and Steel Institute. This does not mean that any attempt is made to fix prices. It is simply a method of making prices public.

"Under this system the price filed by a particular company becomes the publicly announced figure for that company and no change can be made except by filing a new price. Other producers are sure to meet that bid, if their production costs permit. The natural tendency, therefore, is toward a uniformity in prices which comes about because each company is determined to meet the lowest offer of its competitor.

"The result is that price is no longer as powerful a factor in selling steel as was formerly the case. Other features are now assuming their proper place in the selling picture. Sellers are now emphasizing quality of product, convenience of delivery, services which may legitimately be performed for the consumer and like considerations.

"In this situation it is important to note that the small producer is at no disadvantage, but on the contrary his competitive position is in many ways improved. Being more flexible than the large companies in the operations and services which he can perform, the small producer now is finding it possible to make deliveries and provide other legitimate services which are helping him to make sales.

"Thus, it will be seen that competition has not been lessened in the industry by the open price policy but rather has been intensified and turned into new and more healthy and constructive channels.

"The possible benefits to the owners of the steel companies, that is, the security holders, still lie in the future. Very properly, labor and consumers are the first to derive direct benefits, but unless the steel industry is able to earn a fair profit and make a fair return to investors, as well as provide a decent living wage for its employees, the recovery effort in the steel industry under the code will not prove a permanent success."

To Revise Handbook of Steel Construction

"THE rolling mills and fabricators have for the first time in history come together around a table to completely standardize their structural shapes and engineering design details for fabrication of structural steel," said V. G. Iden, acting secretary, American Institute of Steel Construction in an address before the Central New York Fabricators Association at Albany, N. Y., Jan. 18. "Now that the preliminary work has been completed during 1933 the American Institute of Steel Construction plans early in 1934 to give the benefit of those changes to the public in a comprehensive revision of the Standard Handbook for Steel Construction. This manual for the use of designers of steel structures will include all the important innovations and improvements proved by test and research during the past years of the depression."

Employee Representation At Youngstown S. & T. Co.

IN view of the widespread interest in relationships between management and employees, particularly in the steel industry, Youngstown Sheet and Tube Co., Youngstown, Ohio, has prepared a description of its employees' representation plan. This plan, which has functioned with satisfaction for 15 years, is outlined in a twelve page booklet.

Grace Surveys Results of Recovery Act

"I THINK it may be said that a sounder basis for industry has been developed out of these hard times than it has enjoyed at any time during the post-war period," says Eugene G. Grace, president, Bethlehem Steel Corpn., in an article "Industry and the Recovery Act," in the February issue of *Scribner's Magazine*.

The apprehension is lessening, believes Mr. Grace, that the Recovery Act was a cloak for ultimate socialization. "Even if the Government were tempted into the paths of social dictatorship," he affirms, "American tradition is so strongly individualistic that public opinion would soon block any such effort."

Under codification, in Mr. Grace's opinion, industry has become better informed as to its own structure and activities. "Many books have been written on oil, steel, automobiles and other industries. Universities have kept case records of industrial operations. Yet none of those have got at the essence of the matter as have the codes, under pressure of necessity. I can speak with experience in the steel industry where as a result of 60 days and nights of effort by steel executives, with the Government, there was produced its Code of Fair Competition. In that compact document is the summed-up experience of 50 years in the steel industry, and a clear statement of the rules and regulations which govern its mode of operations."

Mr. Grace believes that industry has been given too little credit for its individual responsiveness to the emergency. "It is significant in this connection," he remarks, "that the steel industry under the code brought employment up to 417,000 men in September, 1933, in the face of a 41 per cent operation. This compares with 420,000 steel employees as estimated by the National Recovery Administration for 1929, when the average operations were around 89 per cent. Wage rates were also restored to almost the peak time level. Such a whole-hearted carrying out of the purposes of the act, in action as well as in form, is an encouraging commentary on the vigor and integrity with which industry has embraced this situation."

Profits Essential to NRA

The author believes that profits are essential if wages are to remain high. "High wages must be maintained, yet high wages cannot last for long if they are obtained by dipping into surplus.

"If the trend of agitation should be in the direction of confiscatory taxes, of the crippling of business in all directions by a host of regulations dealing with production, we should, indeed, find ourselves seriously handicapped in battling the depression. Happily, I believe that such action is not contemplated. There is already a growing public opinion that we have had a heaping dish of this porridge of new conditions, and to get the benefit of it, we must have time to digest it.

"Industry has every reason to be well pleased at the better deal for labor which has come about in the past few months under the Recovery Act. This satisfaction is real, not simulated. Business, depending upon volume sales, knows better than any theorist that widespread purchasing power is the heart of trade. The higher wage scales were put into effect by many industries weeks before Washington signed their codes. Industry knows that it is an enlightened and intelligent policy to pay the maximum wage rates which the profits of a business will bear."

At the present time, states the author, the wages in many industries are exceeding what the gross receipts justify, "in the hope that an up-turn in business will result from the better condition of the industrial population."

Labor Relations

On the subject of labor relations, Mr. Grace writes as follows:

"Recently we have witnessed, as often occurs in times of stress, an agitation to return to the old order of setting up a battle-line between the employees and the owners. The economic situation, however, is vastly changed from 30 years ago. Today if agitators wish to make war upon the owners, they are attacking the stockholders. In fighting the stockholder-owners they will find that they are fighting the general public and frequently themselves. Today the dividing line has gone. Management and laborers are all employees of their respective corporations, hired to conduct the business. Their relations are an integral part of the business not possible of dictation from the outside, any more than any other activity of it. That is why our employees' representation plans with various committees made up jointly of management's representatives and the general force are realistic and responsible."

In connection with the elimination of price speculation, Mr. Grace sees one of the chief advantages of the codes, and pictures the situation as it had existed in the steel industry before it was codified.

"The selling of steel in 1932, and for the years preceding, had all of the confusion of the selling of rugs in a Turkish street fair. It is true that from time to time some major company would publish a price to apply on the next quarter's business, and all the other companies would adopt that price for a few hours. Then the haggling would begin. Unfortunately every separate sale became virtually a separate dicker. Had the law permitted, the situation would have been remedied long since. Why should any company be confronted with the disturbing situation of having its entire financial structure continually at the mercy of negotiations between customer and salesman?

"What the steel industry has done with the price structure," says the author, "is to put it on a basis similar to that of retail trade, with announced prices for its merchandise so that the public will know the rock-bottom figure; and will be sure that every one else is buying at the same price from any one supplier. That is the recognized retail policy in this country, and has been for many years. Without such policy it would be impossible for our great retail stores to transact the daily volume of business which they enjoy at present. Picture a mercantile situation in the metropolitan area where every purchase of a suit of clothes, a hat, a pound of sugar, a dozen eggs, was preceded by an extensive haggle over the price tag."

Room for Initiative

There is still the fullest room under this price set-up for the exercise of initiative, says Mr. Grace, who cites the following illustration:

"Let us assume that some company develops a new and economical process for making alloy steel bars, resulting in a substantial saving in the cost of production. Such a company by reducing its price will undoubtedly get a larger volume of business from this competitive advantage. No penalty can be inflicted, or should be inflicted, for such lower price, because it is the result of manufacturing enterprise. The competitors will then be obliged either to learn how to make the material with equal economy, or discontinue the production of that particular material. Thus the pricing policy adopted by the steel industry has the advantage of encouraging lower production

costs, at the same time preventing cut-throat practices."

Merchandising Opportunities

Improved merchandising will be an outcome of the new conditions, in the opinion of Mr. Grace, who comments upon the daily dickerings regarding price which occupied the minds of sales people to the exclusion of more fundamental studies.

"With this waste motion of constant negotiation done away with, there will be new standards and factors emphasized in selling more than ever before. These considerations will play a large part:

(1) The character of the company.
(2) Integrity in every policy.
(3) Close relationship between salesman and customer.
(4) Service by the producer in the way of metallurgical, engineering, or other specialized knowledge.
(5) Sales cooperation with the distributor.
(6) Reciprocity.
(7) Undeviating quality of the goods as represented.

"I believe that all of these points will tend toward higher standards in industrial selling. Take the point of reciprocity, which is frequently criticized. Within legitimate limits it is deeply rooted in human nature. Assuming that quality and service are equal, we all tend to do business with people who do business with us and in whom we have confidence. Friendships will play perhaps even a stronger part, and by that I mean legitimate friendships based on mutual respect. From now on, the salesman will sit less at his desk, and will meet with the customer more frequently. He will conduct himself at all times in a way to merit the highest confidence. We would all rather do business with individuals on whose integrity we can rely 100 per cent and for whom we have a friendly feeling. For this reason I feel that business will operate more on that basis, will be more human and less impersonal."

New Need for Advertising

A new field for advertising especially in the companies which make semi-finished products, is seen by Mr. Grace. Concerning this point, he says:

"Along with this change in marketing practices there comes a new utility for advertising, especially in those companies which make semi-finished products. Until recently, the steel industry, and industries of a similar type, have been extremely moderate in the use of advertising as a means of salesmanship. In the consumer field advertising grew up as a necessary means of reaching large numbers of persons who could not be approached frequently by personal calls. Advertising, in short, is a medium which is always necessary in dealing with volume sales.

"In the industries which sell to manufacturers, jobbers, and dealers the total number of purchasers is much smaller, and the urgency for advertising has been less pressing. Under conditions when sales were influenced by all sorts of concessions, now prohibited under the codes, the influence of the advertising message was, in any event, much minimized.

"We now face a very different condition. Selling will be on the basis of the points which I have mentioned, emphasizing the inescapable fundamentals of service, quality, and integrity. Advertising will help the sales force, by adding to the calls of the sales force a schedule of messages through the printed page. These messages will call on more people, more frequently than is possible for any sales force, no matter how large.

"These advertising programs will cull out and catch the attention of prospective customers at the time when they are ready to buy, giving active leads to the sales force, and saving the waste motion of calling on inactive prospects.

"My comments here may seem like A, B, C, to those who are selling to the ultimate consumer, but I mention them because they are relatively new considerations in the selling practices of the so-called heavy industries. In short, in our new program for winning business, our industrial companies find ready at hand the useful function of advertising, the advantages and limitations of which have already been thoroughly tested in the general consumer field."

The position of the steel industry before the public, due to the airing of facts under codification, has become better than at any previous time in its history.

Continuing the Benefits

The author does not regard the Recovery Act as a finished piece of work, nor does he look upon its results as temporary. "No one would say that any act is perfect. Certain, however, is the advance over the chaotic conditions which existed hitherto. As time goes on and conditions change, certain modifications may be desirable. So much benefit has arisen to business, labor, and industry under its provisions, however, that one asks the question: What shall we do if the period of the emergency is over at the end of the two-year limit indicated in the act? Indeed, one hopes that the emergency may be over before that time, and if that is the case, are we willing to throw overboard the benefits which have been derived from this experience?

"I think not. I think that we have learned a great deal which can be and must be preserved for the benefit of the future. The following months will test out the principles of the Recovery Act still further. We should watch its progress constructively with the object of preserving its best features for the years to come."

Protest Rail Salvage Clause In Scrap Institute Code

M. K. FRANK, of Pittsburgh, has filed with the Recovery Administrator a protest against certain of the definitions of the Scrap Iron and Steel Code as submitted. The protest, which is dated Jan. 20, has to do particularly with the salvaging and buying of new and used rails and track material where the purpose involved is reselling for use of the original nature and not remelting.

"There are a number of firms in the country engaged exclusively in this sort of business," states the petitioner, "and in the prosecution of their business they have occasion to buy up abandoned railroads with the intention of salvaging the materials these railroads consist of for use again, and not with any intention of reducing these materials to prime matter, such as scrap, etc.

"The question is, are these firms to be classified and subjected to the regulations of a code of an industry such as the scrap industry which, while apparently germane to the business of the rail man, is in reality altogether an alien industry from, and antagonistic to the aims pursued by the rail man."

Interpretation of the codes is asked upon the following lines:

"We further respectfully submit, that, in disposing of the question raised by the Institute of Scrap Iron and Steel regarding the right to dismantle railroads, the only way that will do justice to all groups concerned, is not to allow the inclusion of the exclusive right to dismantle railroads within the definition of the code of any particular group; and that the scrap industry, the wrecking and salvage industry, and the second hand rail business and industry, be each alike and with equal right entitled to have the operation of dismantling railroads within the definition of its code, with the provision that each group when engaging in this operation is understood to be doing it for no other end than the one which the particular group follows and that for such of the materials which it disposes in the manner followed by any of the other two groups, it would subject itself to the regulations of the code of the group with whose business it so alines itself."

British and Continental Steel Demand Broadening

LONDON, ENGLAND, Jan. 23 (*By Cable*).—Experiencing some relief from the recent shortage of coke, and with demand for pig iron still unsatisfied, more British furnaces are being restarted. Official prices for pig iron are as yet unchanged, despite the rising costs of production.

Producers of semi-finished steel are working at full capacity upon an active market and finished steel also is in better demand as more ship specifications are being released. While ship orders are increasing, structural material continues slow, but railway and general engineering requirements are increasing.

Tin plates show a more active demand, but prices continue on the low level because of keen foreign competition. Welsh tin plate producers are now negotiating with French, German and Italian makers for price fixing and allocation of export orders. Welsh output is now 50 per cent, a number of mills having unexpectedly resumed operations after the holiday.

Continental steel demand is broadening, particularly with the Far East, while the United Kingdom has made large purchases of wire rods.

Cartel price advances are now confirmed of 2s. 6d. gold for steel bars shipped to the United Kingdom and 2s. 6d. to 5s. gold for various other markets. Plates have been advanced 1s. 6d. gold for all markets except Japan and Sweden.

Under the Franco-Soviet pact, Russia will buy large quantities of French steel and machinery.

The output of Russian pig iron in 1933 was 7,200,000 metric tons, and the output of raw steel was 6,900,000 metric tons.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9
Billets, open-hrth.	£5 10s. to £5 12s. 6d.
Tin plate, per base box	16s. to 16s. 6d.
Steel bars, open-hearth	£7 17½s. to £8 7½s.
Beams, open-hrth.	£7 7½s. to £7 17½s.
Channels, open-hearth	£7 12½s. to £8 2½s.
Angles, open-hearth	£7 7½s. to £7 17½s.
Black sheets, No. 24 gage	£9 5s.
Galvanized sheets, No. 24 gage	£11 5s. to £11 15s.

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

*Ingots	£2 5s.
*Billets, Thomas	£2 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
*Steel bars, merchant	£3 2s. 6d.
*Sheet bars	£2 8s.
Plates, ¼ in. and up	£4 1s. 6d.
*Plates, 9/16 in. and 5 mm.	£4 3s. 6d.
*Sheets, ⅛ in.	£4 8s. 6d.
*Ship plates	£4 10s.
*Beams, Thomas	£2 19s.
*Angles (basis)	£3 2s. 6d.
Hoops and strip steel over 6-in. base	£3 17s. 6d.
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

*Prices as established by European Raw Steel Cartel.

New Soaking Pit Plant For Am. Steel & Wire

WORCESTER, MASS., Jan. 23.—The soaking pit plant of the South Works, American Steel & Wire Co., will be replaced by a new building and equipment, Clifford F. Hood, district manager, announced today. The replacement program will include construction of an all-steel building, 189 by 103 by 85 ft. and installation of eight new pits, stripping and loading cranes and other equipment. Construction will start as soon as engineering surveys have been completed. The new plant will have a capacity of six ingots per pit, each ingot weighing about three tons. The pits will be placed in line to facilitate handling by traveling cranes.

French Iron and Steel Exports Higher

OVER the first 11 months of 1933 French exports of iron and steel products—2,315,591 metric tons in all—were 277,598 tons greater than the total of exports for the corresponding period of 1932. This gain was quite general throughout the trade with 14 classes of material showing increases and only four decreases. The largest gain was that in steel bars where 1933 shipments exceeded those of 1932 by 11,334 tons. Other increases worthy of note took place in the trade in ingots, blooms, billets and slabs (55,676 tons), cast iron manufactures, in which general classification is included cast iron pipe, (33,265 tons), pipe, other than cast iron (26,930 tons), wire rods (15,821 tons), and hot and cold rolled strip steel (15,416 tons). The trade in only one class of products showed any material decline—shipments of pig iron being 17,424 tons smaller—as of the remaining three classes of material the drop in only one was as great as 100 tons. From the foregoing it is apparent that, while the French export trade in iron and steel products did not, in 1933, approach the high levels of 1928 and 1929, it nevertheless will show a material improvement over 1932 when figures for the entire calendar year come to hand.

To Exhibit New Internal Grinder

AN internal grinder said to operate on an entirely new principle will be included in the exhibit to be held at the plant of the Heald Machine Co., Worcester, Mass., Feb. 1 and 2. In addition to horizontal and vertical internal grinding machines, the company will demonstrate the precision boring of steel as well as bronze and cast iron by means of its Bore-Matic boring machines. Manufacture of borizing tools, together with apparatus developed by the company for lapping and resharpening the tools, will also be shown.

Equipment Required For New Pipe Mill

NEW equipment to be added to the Youngstown Sheet & Tube Co.'s electric-weld pipe mill at Brier Hill works, Youngstown, in connection with the plan to increase range of pipe sizes from present capacity of 26 to 18-in. on down to 8⅝ in. will consist of a cleaning machine to clean the plate before forming; roll equipment in the present forming machine to take care of 8⅝ in. to 16 in. O.D.; a welding machine, located between the present forming machine and the present welding machines to take care of 8⅝ in. to 16 in. O.D.; roll equipment for sizing and straightening machines to take care of 8⅝ in. to 16 in. O.D., necessary changes in cutting-off machinery and testing machines to take care of 8⅝ in. to 16 in. O.D.

The remainder of the equipment of the present electric weld mill will be suitable for the manufacture of the newer smaller sizes. Intention to make the new installation was announced in THE IRON AGE, Jan. 11. page 34.

Less-Carload Rates Suspended by I. C. C.

WASHINGTON, Jan. 23.—The Interstate Commerce Commission has suspended until Aug. 20 railroad rate schedules which propose to cancel less-carload commodity rates on iron and steel products from certain points in Central Freight Association territory to destinations in Western Trunk Line territory and apply instead higher class rates.

Boston & Maine Asks Loan for Rail Purchase

WASHINGTON, Jan. 23. — The Boston & Maine railroad has applied to the Interstate Commerce Commission for authority to borrow $3,300,000 from the Public Works Administration to purchase 30,000 tons of 131-lb., and 112-lb. rails, to repair and air condition equipment and to purchase 10 all-steel passenger coaches.

The rails are desired for delivery in April, 1934, and with fastenings will cost $2,230,000. Repair work, to be carried on in the carrier's shops, will be made on 25 locomotives, 644 coal cars, 80 passenger cars and 174 box cars, while four diners and six de luxe coaches will be air conditioned.

Erie R. R. Asks Loan To Buy Cars

WASHINGTON, Jan. 23.—The Erie railroad has made application to the Interstate Commerce Commission for authority to borrow $11,845,750 from the Public Works Administration to be used for the purchase of 3175 freight cars, 125 passenger coaches and eight all-steel mail cars. The proposed loan has been allotted by the PWA.

The equipment to be bought follows:

Two thousand five hundred 50-ton self-clearing all-steel hopper cars; 500 40-ton steel-sheathed plain box cars; 500 40-ft., 40-ton steel-sheathed automobile cars, of which approximately 150 will be equipped with Evans loaders; 100 steel-sheathed 50-ft. furniture cars; 50 covered hopper cars; 125 50-ft., 70-ton steel-underframe flat cars; 50 semi-through and 75 all-steel suburban passenger coaches and eight mail cars. The estimated cost of the freight cars is $9,057,250. The estimated cost of the passenger coaches and the mail cars is $2,788,500.

The application says no orders have yet been placed for the equipment but that bids have been requested from various builders.

Metal Treating Code Heard in 10 Minutes

WASHINGTON, Jan. 23. — The hearing last Thursday on the code for the metal treating industry required only ten minutes. C. U. Scott, president of the Metal Treating Institute, presented the code and Horace C. Knerr, representing the Commercial Heat Treaters' Association of Philadelphia, filed a brief. Mr. Scott made a request, after presenting the code, to have the industry allowed an increase of 64-hr. a year in the permissible exceptions to the proposed 40-hr. maximum work week. He said the increase was sought to accommodate operations that must be carried through to a finish without interruption. This and other suggestions were discussed at a subsequent meeting of members of the code committee and NRA officials.

A hearing on the code for the Drop Forging industry will be held on Feb. 1 before Deputy Administrator H. O. King.

Armco Purchases Belfont Steel & Wire Co.

AMERICAN ROLLING MILL CO., Middletown, Ohio, has purchased the plant and property of Belfont Steel & Wire Co., Ironton, Ohio, consisting of a tract of 640 acres of waterfront land, with nail mill, wire mill, two blast furnaces and miscellaneous buildings, offered at public sale, Jan. 18, for a consideration of $76,000. This plant represented an original investment of about $1,000,000.

Rumors that Armco looked with favor toward the acquisition of this plant have been afloat for years. A study of the American Rolling Mill Company's holdings at Ashland, Ky., makes it plain why they desired this property. Several years ago Armco acquired the Norton Iron Works, at Ashland, and later the property of the Ashland Steel Co. The purchase of Belfont adds a third link to their chain.

For a number of years the Norton Iron Works, whose property adjoined that of the Ashland Steel Co., furnished them molten pig iron for conversion into Bessemer steel ingots. These ingots were rolled into rods by the Ashland Steel Co. on their Garrett rod mill, and the product sold to Norton Iron Works and Belfont Iron Works, both of which companies were manufacturers of wire, nails, mesh, etc.

Unfortunately, internal dissension among these three companies finally broke up what for years had been a very fine and profitable arrangement. The American Rolling Mill Co. has long been conscious of the profit possibilities of this set up. Several years ago it acquired the Norton Iron Works, modernized the blast furnaces and scrapped the obsolete wire and nail equipment. Its next step was to acquire the Ashland Steel Co. with its Garrett rod mill and power plant.

The purchase of the Belfont Steel and Wire Co. at Ironton, with its wire and nail department now completes the chain of production. Piecing the various parts together the picture now seems quite clear. The American Rolling Mill Co., with its approximately three miles of river front along the Ohio at Ashland, Ky., has one of the most modern steel plants in the country and no doubt Armco is planning a diversification of its products.

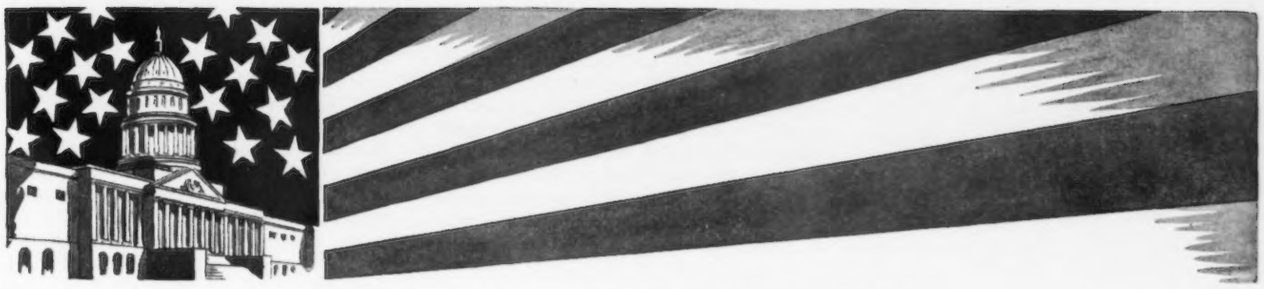
Booklet Gives Data on Machine Gas Cutting

MACHINE gas cutting—typical applications as well as the wide variety of modern equipment developed to meet both small and large shop requirements—is described and illustrated in a 92-page, 8½ x 11 in., booklet recently issued by the Air Reduction Sales Co., 60 East Forty-second Street, New York.

Review of the contents of this informative booklet may properly be prefaced with comment on the arrangement and make-up, which are unusually attractive. Large, page-bled illustrations and numerous silhouetted details challenge attention not only because of the artistic effect but because of the story they tell in themselves of the high status of this important process. The type is large, and is arranged to give unified page appearance. Unity has also been achieved in the arrangement of subject matter. In the first section the reader is taken through an unnamed plant that has been using machine gas cutting for several years. Here he is shown, by the chief engineer, the advantages of the process, the operation of multi-torch and other machines, the clean, smooth finish obtained, the range of steels cut, cutting speeds employed, cost of gas consumed and other details. From this visit the reader goes into a pictorial section that illustrates what a wide variety of other plants have done in producing large and small, simple and intricate parts, singly or in quantity, prior to welding or other fabrication. The parts and structures shown range from small handhole covers to large and heavy hot-metal cars and ladles.

The next and largest section of the booklet describes at length the construction, operation and range of several flame cutting machines designed for work such as previously pictured. First is the Airco Radiagraph, a portable motor-driven unit employing steel tracks for straight-line cutting and a radius rod for arc and circle cutting. A side roller attachment for cutting irregular shapes having long sweeping curves, either simple or compound, is available, as well as a two-torch holder attachment and a simpler two-torch holder for splitting I-beams.

Next is a group of machines designated as the Camograph, Omnigraph, and Tramograph, which reproduce by means of a magnetically-operated tracing device an unlimited variety of shapes on a quantity production basis. The final group comprises the Oxygraph and the Travograph, which operate on the pantograph principle. The Travograph, a new machine, has the pantograph assembly mounted on a carrier that travels on tracks. It cuts plates and slabs over a more extended area than the Oxygraph.



THIS WEEK IN WASHINGTON

Attack on NRA Looms in Senate and Trade Commission

But Its Edge is Dulled as General Johnson Discounts Charge that NRA Oppresses Small Units

By L. W. MOFFETT
Resident Washington Editor
THE IRON AGE

WASHINGTON, Jan. 23.—Tense under-the-surface differences between the National Recovery Administration and the Federal Trade Commission over the basing point system in the iron and steel industry apparently were partially responsible for the executive order issued last Saturday by President Roosevelt giving to the Commission and the Department of Justice jurisdiction to pass upon complaints against practices under codes. Equally as responsible for the order were senatorial attacks on the NRA, charging it with oppressing small enterprises. National Recovery Administrator Hugh S. Johnson lashed out boldly at both the Commission and the senatorial critics in a bristling radio address before the National Retail Dry Goods Association in New York last Thursday night.

The executive order giving to the Commission and the Department of Justice powers heretofore exercised by the NRA created a stir. Specifically it is intended to protect small enterprises. Actually, however, it is so broad that any interest dissatisfied with disposition of his case before an NRA code authority or other agency, may take his case to the Commission. If the Commission lacks jurisdiction the case may be referred to the Department of Justice. The purpose is to prevent monopolies or oppression of small enterprises through code operations.

"Conceptions as to what practices are monopolistic and are beyond the allowable area of the National Industrial Recovery Act will thereby be enabled to rest upon realistic foundations of the place to be accorded to concentrated capital and cooperative effort in our modern economic civilization," said the White House press statement. "The result should be a coherent body of law, protective of the large consuming interests and yet broad enough to afford the necessary play for industry to act as a unit, free from the pressure of unrestrained and wasteful competition. Such pathways lead to industrial peace in the fullest sense of that word, a peace that will be just to the various contending interests and which will afford a permanent basis for our economic reconstruction."

Basing Point System Attacked

The row between the NRA and the Commission over the basing point system in the iron and steel industry was quietly brewing for some time. It was known that conferences on the subject were under way between General Johnson and Federal Trade Commissioner March. The Commission is said to have prepared a memorandum charging that the basing point system was being used by the iron and steel industry for price-fixing and monopolistic practices. It has been persistently reported that the memorandum was laid before President Roosevelt by the Commission after failure to reach an agreement with the NRA. However, denial was made at the White House that it had received a report on the basing point system. It is evident, however, that the situation in some way had been called to the attention of the President. It is understood that, harking back to its stand in 1924 when it ordered an end to the Pittsburgh-plus system of basing prices in the steel industry, the Commission was insistent upon the establishing of a delivered price basis.

There was, of course, more than a single base for quoting steel prices when the Pittsburgh-plus case was decided and with expansion of capacity in other districts added bases were set up. Under the code further bases were established. The industry has taken the stand that this development simply is a development consistent with the law of supply and demand. It has been opposed to the idea of a delivered price system because of the complications it would create. It would call for naming prices to all points of delivery throughout the country by working out freight charges, etc., as against the system of fixing bases on which to calculate freight rates. It is argued that in either case the cost to the consumer would be identical. The cement industry is reported to be finding it a complicated task to determine delivered charges.

Code Held to Establish Practice

The attitude of the NRA appears to be that the basing-point system, and other practices, are matters that are specifically brought under the

observation of the National Recovery Administrator by the terms of the code. In his report last August on the steel code Deputy Administrator K. M. Simpson pointed out that a number of protests had been made against alleged changes in basing points and price provisions, but that the protestants had not satisfactorily established their objections to the operation of the code. He proceeded to explain that a 90-day period had been provided for experimental observation of operation of the code. The code was extended with Presidential approval without any change being made in the code. But like all codes it is subject to revision upon request from the NRA. There has been no indication that any change would be made in the basing point system. Complaints before the Consumers' Advisory Board made no attack on the system itself, though one did request the establishing of Youngstown as a basing point for sheets and plates, while others asked for additional basing points.

The Federal Trade Commission apparently felt that it had lost control over the basing point system, though actually it had never been either approved or disapproved by the NRA. It remains to be seen whether or not the President's executive order will turn over to the Commission power to strike out against the basing point system. In this connection, however, it has been observed that the Commission did nothing about the system since its cease and desist order of 1924, nine years before the NRA was established.

Much has been said about price-fixing and the Commission is understood to have emphasized this point also. Countering this charge it has been pointed out that under the code, steel companies are required to openly file for public inspection prices they are going to charge. Being available among competitors, it is explained, it is obvious that if the latter are to get business they must meet prices that are filed and knowing what they are it is natural that there should be greater uniformity.

The resentment General Johnson has toward the Federal Trade Commission was indicated in his address in New York before the Dry Goods Association when he spoke of a confidential "spy" report to the Commission by one of its investigators. The Administrator said he understood the report had been sent to the President and that the latter apparently ignored it. Without detailing the character of the report, General Johnson vigorously said that "there was nothing in it but a charge that we have made mistakes."

Attack Anticipated by Johnson

The General had anticipated the attack that was going to be made in the Senate on the NRA. It was well known even before Congress convened that it was forthcoming. It broke only a few hours before General Johnson made his address, though it is probable the address was prepared before the attack was made. The attacks came chiefly from Senators Borah, Nye and Glass, and charged that small enterprises were being oppressed by the NRA. There was a demand for restoration of the anti-trust acts in full force and for action by the Trade Commission against alleged price fixing and monopolistic practices.

"There will be a distinct movement to repeal this (Industrial Recovery) Act under this slogan of 'oppression of small enterprises,' said General Johnson. "It won't be a forthright and open motion for repeal. These gentlemen do not dare to do that. Some of this will be done by a Senator whom I love for his intestinal fortitude perhaps more than any Senator other than Carter Glass, but yet I shall oppose him on this paradox as long as breath within me lies. It will be an attempt to put in the act about three lines forbidding action by any industry in unison and, in effect, substituting the Federal Trade Commission for the NRA."

The General proceeded to attack the Trade Commission, though leading off with an expression of admiration for it. He declared, however, that "at this crisis we must look facts in the teeth and by moving in to control this administration it will kill the recovery program." The General, hitting harder, declared that the Commission had failed in its original purpose to improve industrial conditions by letting industry act in unison, a purpose for which the NRA was set up. The Commission failure, "dismal and complete," was even held to be a "negative cause of the depression of 1929."

F. T. C. Had Its Chance Before NRA

"There was—and there is—about as much cooperation between the Federal Trade Commission and industry as there is between a lion tamer with a black-snake whip, a revolver and a strong-backed chair, standing in a cage with six great jungle cats snapping and snarling on six star-spangled hassocks—that is their version of economic planning and industrial self-government," the General exclaimed. "Yet that is the condition that these economic genii want to restore."

Other remarks showed clearly that the General had a capital run-in with the Commission.

"But it is still said that I suppressed a report of the Federal Trade Commission to the President on the operation of the NRA," said the General. "I asked the Federal Trade Commission to send a man over here to see if we were doing properly what we had to do. He came but he never said a word to me. I now understand that he did report to the Commission in a paper marked 'confidential'—one of those X21 confidential spy reports which no one had the courtesy to discover (disclose?) to me. There is suppression for you. I now learn that somebody sent it to the President. But I never heard of that report until last night when a self-invited counter-espionage agent told me of the subject matter. There was nothing in it but a charge that we have made mistakes. Nobody is louder in that assertion than I am. Apparently the President—gentleman that he is—ignored it."

The General had much to say also in rebutting the charge that the NRA oppresses small business.

NRA Oppresses Wage Chiselers

"If NRA oppresses anybody, it does not do so by monopolistic tendency," he declared. "It may do so for another reason. I can tell you the single reason and then prove it to the smoking hilt. It oppresses people who are not willing to accord decent wages and proper hours to human labor, and I am willing to take any man to the hustings on that statement—including these professional dialecticians. But they will not dare go there with me—none of them. The facts are against them and these facts are of such a nature as to put them on a very hot spot."

Despite General Johnson's statement, however, General Counsel Donald Richberg of the NRA broke forth with a statement making an attack on and warning of prosecution for price-fixing, specifically mentioning the bituminous coal industry. He said there had been a widespread misunderstanding, even among public officials, that monopolistic practices might be sanctioned in the codes. He stated that there have recently come to the attention of the Administration instances in which industrial operators have been organized to carry out the provisions of codes and then have proceeded to disregard their obligations under the codes or the restrictions upon them in the codes. It was declared that during the meeting here last week of the Industrial Bituminous Coal Board it became evident that some groups of coal operators had the impression that they were now free to fix prices and otherwise to act in combination without obtaining the approval of the representatives of the NRA.

"A timely warning should be given wherever members of an industry have assumed mistakenly that they have been licensed by virtue of the adoption of a code to combine and disregard the restrictions imposed by the NRA to protect the public interest, they are simply laying themselves open to prosecution under the anti-trust laws and that the provisions of Section 5 of Title I of the National Industrial Recovery Act do not exempt them from the penalties of those laws," Mr. Richberg declared.

... PERSONALS ...

The American Sheet & Tin Plate Co., as of Jan. 16, announced the following changes in organization, due to the serious illness of J. I. ANDREWS, vice-president and general manager of sales.

FRED M. FULLER, assistant general manager of sales, is appointed general manager of sales, J. I. ANDREWS continuing as vice-president in charge of sales.

GEORGE G. MCGLAUGHLIN, assistant manager of sales in Cincinnati office, is appointed assistant general manager of sales in Pittsburgh, succeeding Mr. Fuller.

W. ARCH IRVIN, assistant to vice-president, is transferred from the operating to the sales department.

WALTER C. CARROLL, of the general sales office in Pittsburgh, is appointed manager of sales in New York office, succeeding A. J. THOMAS, transferred.

FRED M. FULLER, new general manager of sales, has been identified with the sheet and tin plate industry for nearly 40 years. Beginning in 1894 with the Falcon Tin Plate & Sheet Co. of Niles, Ohio, he went to Chicago in 1898 when Falcon consolidated with the American Tin Plate Co., and later was moved to the New York office of the company, where he remained until 1904, when upon the formation of the American Sheet & Tin Plate Co. he was transferred to Pittsburgh. Since 1909 Mr. Fuller has been assistant manager of sales.

The entire business career of GEORGE G. MCGLAUGHLIN has been with the American Sheet & Tin Plate Co. From assistant manager of sales at Cincinnati office, he becomes assistant general manager of sales at Pittsburgh, succeeding FRED M. FULLER.

W. ARCH IRVIN, assistant to vice-president, is transferred from the operating to sales department. Before joining the American Sheet & Tin Plate Co. forces a year ago, he was associated with the Federated Metals Co. He is a son of W. A. IRVIN, president of the United States Steel Corpn.

WALTER C. CARROLL, newly appointed manager of sales in the New York office of American Sheet & Tin Plate Co., began his business career with that organization in 1902, and served it at Detroit, San Francisco and St. Louis before going to Pittsburgh in 1908 as assistant general manager of sales. In 1921 he became vice-president in charge of sheet steel sales for the Inland Steel Co., Chicago, where he remained until August, 1927. At that time he became president of the National Association of Sheet and Tin Plate Manufacturers, serving until January, 1928, when he resigned to become president of the Oil Well Supply Co., Pittsburgh, where he remained for several years and rejoined the American Sheet & Tin Plate Co. in January, 1932.

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F. STANLEY JONES, who became identified with the Colorado Fuel & Iron Co. as an errand boy in 1908 and who has been in the sales field nearly all of the time since, has been appointed sales manager, wire products. W. H. MESSNER has been made sales manager, rolled products, and GEORGE TRITCH, assistant manager of sales for the steel division. Mr. Messner was formerly associated with the Midvale Steel company and started his work with the Colorado company in 1918. His entire period of service has been directly in the sales department, and he has been assistant sales manager since 1925. Mr. Tritch also became identified with the company in 1918 and has filled an important position since.

LESLIE B. WORTHINGTON has been appointed assistant manager of sales of the Chicago district office of the Illinois Steel Co. Mr. Worthington entered the employment of the company immediately after his graduation from the University of Illinois in 1923. Following an apprenticeship period at the South Chicago works, he entered the general sales department, where he has been employed in various capacities up to the present time.

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THOMAS W. BARNES has joined the Chicago sales staff of the Mercury Mfg. Co., Chicago, makers of tractors, trailers and lift trucks. He has long been in the field of industrial material handling equipment, having represented the Baker R & L Co. and other manufacturers. He was until recently vice-president of W. F. Hebard & Co.

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DONALD MACMURRY has resigned as a director and vice-president of Acme Steel Co., Chicago. C. J. SHARP, assistant sales manager, has been elected to the directorate succeeding Mr. MacMurry, but the office of vice-president has not been filled. Other directors and officers have been re-elected.

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MARVIN W. DAVIS, formerly district sales manager for Taft-Pierce Mfg. Co., has joined the sales and engineering staff of the Sheffield Machine & Tool Co., Dayton, Ohio.

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H. P. PARROCK, consulting engineer, Brookline, Mass., has opened an office at 11 Wiswall Circle, Wellesley, Mass., for wage production and cost studies, for industrial research and counsel in the metal trades and management. After graduation from the Massachusetts Institute of Technology in 1901, he had an extended experience, including executive positions, in the ferrous and non-ferrous foundry field and has been an occasional contributor

F. M. FULLER

F. S. JONES

W. H. MESSNER

G. TRITCH

L. B. WORTHINGTON

to these columns, including the early advocacy of alloy castings for the jobbing iron foundry.

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RALPH F. TILLMAN has been elected president of the Industrial Steel Casting Co., Toledo, Ohio, to fill the vacancy caused by the recent death of Joseph L. Tillman, Sr. JOSEPH L. TILLMAN, JR., has been elected vice-president in charge of plants and production and also secretary. C. C. SMITH, vice-president, has been made director of sales and sales promotion. L. J. TILLMAN has been elected vice-president of the Wine Appliance Co., Toledo, succeeding Joseph L. Tillman, Sr., and R. F. TILLMAN has been elected secretary and treasurer of that company.

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HOWARD BURNISH, formerly identified with the A. O. Smith Corpn., Milwaukee, has opened engineering offices in the Vandergrift Building, Pittsburgh, specializing in the design of electric weld pipe mills. He has had a part in the designing of the Spang Chalfant Co.'s mill at Ambridge, Pa.

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C. A. KRAL, who has heretofore had charge of the blooming, bar, slabbing and continuous strip mills of the Wheeling Steel Corpn., Wheeling, W. Va., has been appointed assistant general manager of the company. He is being succeeded in his old post by his assistant, FREEMAN H. DYKE.

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RAY DEVLIEG has been named works manager in charge of factory operations of the Reo Motor Car Co., Lansing, Mich. For many years he was with the Chrysler Corpn. in charge of several of its plants and recently has been assistant to the president of the Reo company.

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R. E. OLDS, veteran automobile manufacturer, has been appointed chairman of the executive committee of the Reo Motor Car Co., Lansing, Mich., assuming active management of the company's activities. RICHARD H. SCOTT will remain as president, but retires as general manager.

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ROBERT KIRKPATRICK, who has been associated for the past 14 years with the Norton Co., Worcester, Mass., and for the past four years as sales manager of the refractories division, has been made assistant sales manager of the abrasive products division.

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ARTHUR R. PETTERSON has been elected vice-president of the Thomson-Judd Wire Machinery Co., Lynn, Mass., succeeding the late Josiah Judd.

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WILLIAM C. HAYES, formerly vice-president and general manager of J. K. Larkin Co., Inc., and subsequently manager of the iron and steel department of the American Export Co., has accepted a similar post with Otto Kafka, Inc., New York. GEORGE W. HOFFMAN, formerly export manager of the Stockham Pipe & Fittings Co., has been placed in charge of exports of the Kafka company.

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O. W. MCMULLAN, for the past nine years assistant chief metallurgist in charge of research and improved practice at the Timken-Detroit Axle Co. plant, Detroit, has been appointed chief metallurgist. After his graduation from the University of Michigan in 1922, Mr. McMullan was chemist and metallographer with the Studebaker Corpn. before joining the Timken company in 1924.

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CLINTON L. BARDO, president, New York Shipbuilding Corpn., Camden, N. J., has been elected president of the National Association of Manufacturers, succeeding ROBERT L. LUND, who has been president of the association for two years and now becomes chairman of the board.

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GEORGE H. HOUSTON, president, Baldwin Locomotive Works, Philadelphia; CHARLES R. HOOK, president, American Rolling Mill Co., Middletown, Ohio, and E. C. HEIDRICH, JR., president of the Peoria Cordage Co., Peoria, Ill., and a former president of the Illinois Manufacturers Association, have been made vice-presidents.

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J. B. DURKEE has been appointed manager of the Houston, Tex., office of the A. M. Byers Co., Pittsburgh. He formerly represented the company in the Houston territory and more recently has been stationed at Tulsa, Okla. Mr. Durkee succeeds H. B. Weathersby who died Dec. 19, 1933, from shock incurred as a result of an automobile accident.

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CHARLES A. CARPENTER has been appointed acting district manager of the Pittsburgh office of the Bureau of Foreign and Domestic Commerce, Department of Commerce, succeeding WILSON K. RAY, who is now associated with the NRA. Mr. Carpenter is a graduate of Cornell University, and has recently been active as a manufacturers' agent in Pittsburgh, with offices in the Park Building.

Navy Makes Armor Plate Awards

THE Navy Department has awarded contracts for 5,280 tons of Class B armor plate for 4 light cruisers. Distribution was made as follows: Bethlehem Steel Co., 2360 tons; Midvale Co., 1767 tons; and Carnegie Steel Co., 1153 tons.

OBITUARY

GIUSEPPE FACCIOLI, formerly works engineer and associate manager of the Pittsfield, Mass., works of the General Electric Co., died in that city on Jan. 13, about four years after his retirement because of ill health. He was a native of Milan, Italy, and came to this country 30 years ago, after his graduation from the University of Milan. After initial employment with the New York Edison Co. and later with the Interborough Rapid Transit Co., he became a designing engineer for the Crocker Wheeler Co., following which he became associated with William Stanley. When the Stanley company was absorbed by the General Electric Co., Mr. Faccioli became identified with the railway department of the company at Schenectady and later at Pittsfield. In 1913 he was appointed works engineer of the Pittsfield plant, and in 1927 became associate manager.

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JOSIAH JUDD, at the time of his death vice-president and general manager of the Thomson-Judd Wire Machinery Co., a subsidiary of the Thomson-Gibb Electric Welding Co., Lynn, Mass., died at the New Haven, Conn., Hospital, on Dec. 19, aged 63 years. Previous to the formation of the Thomson-Judd company, he was president of the Wire Machinery Co. of America.

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CHARLES N. GILBERT, one of the founders of the Gilbert & Barker Mfg. Co., Springfield, Mass., died on Jan. 17 at Great Barrington, Mass. He was born in Chicago 91 years ago. Early in life he went to Springfield where with H. F. Maxim and John T. Barker he formed the Springfield Gas Machinery Co., which later became the Gilbert & Barker Mfg. Co. The company some years ago was sold to the Standard Oil Co.

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GEORGE C. AMES, former treasurer of the American Brake Shoe & Foundry Co., New York, died at his apartment in the Shoreham Hotel in Washington on Jan. 17, from a heart attack. He was 67 years old.

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A. F. CRANK, for many years chief engineer for the Conveying Weigher Co., New York, died of peritonitis at his home in Pasadena, Cal., on Nov. 4, aged 64 years.

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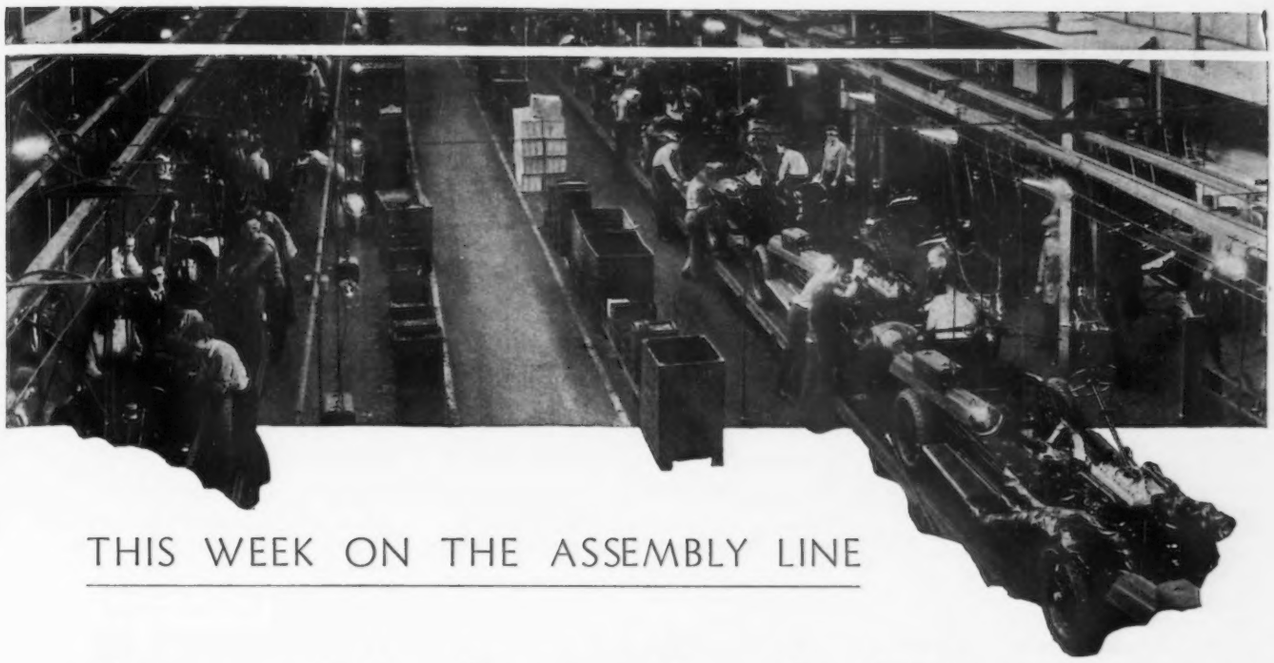
HENRY M. RALSTON, who organized a chemical manufacturing company in Chicago in 1868, died Jan. 21 at the Dixon, Ill., home of his son, John G. Ralston, president of the Reynolds Wire Co., Dixon, Ill.



THIS WEEK ON THE ASSEMBLY LINE

Automobile Assemblies Still Hampered By Production Difficulties

DETROIT, Jan. 23.

AFTER the ballyhoo originating in automotive publicity offices is examined closely, and due allowance is made for the large backlog of unfilled retail orders, the fact remains that obstacles interfering with motor car production will not be entirely removed much before March 1.

It is now conceded that January's total will be higher than seemed possible two weeks ago, probably reaching the 125,000 mark, but what gains will be registered next month cannot yet be determined. Assemblies should rise to 200,000 units or better, but this achievement is dependent on the untangling of the present manufacturing knot, which one day permits the output of a considerable number of cars and the next day closes down assembly lines completely.

Both General Motors and Chrysler are having their troubles. The bottleneck of both Chevrolet and Pontiac production continues to be the Chevrolet gear and axle plant, where knee action front end units and rear axles are made. On several days the past week Chevrolet's assemblies are understood to have risen to almost 2000 cars, but it has been impossible thus far to keep operations consistently near that level. Chevrolet's output this month is not likely to be over 30,000 units at best and probably will be closer to 25,000.

Having originally scheduled 12,000 cars this month, Pontiac probably will do well if it gets out 6000 to 7000 cars. Oldsmobile, with 100,000 cars as its 1934 objective, has not yet started to make its low-price six. It is hoping to build 5000 of them in February for dealers and 12,000 in March for delivery to customers. Tentative plans for the Oldsmobile eight call for 10,000 units during February.

Plymouth is said to have pushed up assemblies to about 500 cars a day, six days a week, but has been handicapped by a shortage of bodies. This situation probably will be relieved this week when body deliveries by the Briggs Mfg. Co. are materially increased. Dodge assemblies of both trucks and passenger cars do not total more than 250 units a day. Chrysler's Jefferson Avenue plant has not started to assemble Airflow Chryslers or De Sotos on a production basis.

To build up a bank of parts Chrysler manufacturing departments at the Dodge plant and the Plymouth and Dodge machining departments are running 24 hr. a day. This bulge in operations extends to the Dodge foundry, which produces cylinder blocks and other heavy castings for all the Chrysler car-making divisions.

Hudson has been seriously handicapped by delays in securing dies. Reo and Hupmobile also are said to have been affected by die troubles. With most manufacturers unable to make definite delivery promises, it is not surprising that retail sales have sunk to a low level with little hope of a vigorous recovery until March.

Production Is the Bottle Neck

With increased production the key to increased sales, leading executives have gone so far as to devote their personal attention to smoothing out operating difficulties.

Aside from the trouble caused by the unfamiliarity of production departments with the new process of making front-end units, knee action wheels are costing the industry a large sum in greater labor and material expenses. The completely assembled front-end unit of an important manufacturer who has adopted independent front wheel springing is costing $20 more per car than the orthodox unit, including the front axle. To an industry which figures savings in terms of nickels and even pennies per car, this is a heavy burden, especially when it is added to the increased costs necessitated by the NRA codes.

Despite this burden, plans are afoot by at least one maker to extend the knee action design to rear as well as front wheels before the current year is ended. There is much discussion in Detroit as to the merits of independent wheel suspension and the actual need of them on American cars. A French automobile engineer of high standing is authority for the statement that independent springing is necessary on foreign cars because of cobble stone streets and bad roads,

but that American highways are so uniformly good that the same urge for its adoption does not exist here. The inference is that knee action has come into its own largely because of its sales value.

Although there is merit in this contention, the fact is that knee action is a logical step toward the attainment of that smoothness of riding and perfect comfort which every manufacturer dreams of finally achieving in his car. American automotive engineers think of it in that light. A potent reason why it was not applied to all four wheels on current models is its relatively high cost.

It is no exaggeration to say that independent springing is on trial and its fate, no matter what its theoretical value, depends on how the public takes to it in the next three or four months. There is no doubt regarding the existence of a certain group of buyers which will hold off making purchases until the new springing design has been tested thoroughly in service. This may have a retarding effect on sales of cars equipped with knee action wheels. The fact that every dealer, no matter what car he handles, has set up in his window an exhibit proving that the Olympic eight as well as the Pontiac eight has knee action in its wheels, only augments the confusion in the buyer's mind.

Still a Buyer's Market

Manufacturers are realizing more every day that the car buyer, even though his economic status may have improved substantially, is in no mood to be "taken for a ride" on prices. After all, this is still a buyer's and not a seller's market and the buyer has learned during the depression that he can drive his car much farther than he had supposed without running into major trouble. When he discovers today that he must pay from $20 to $100 more for his new car and must take $50 to $200 less for his used car, he is apt to decide that his old car is good for another year's service. This is the chief obstacle in the path of a large expansion in retail automobile sales, and no one realizes it better than high automotive sales executives.

To give the car buyer a "break" in the present situation, Chevrolet has abolished the ancient practice of quoting "f.o.b. Detroit" prices and instructed its dealers to sell only on a basis of the price of the car delivered to the door of the buyer's home. For the first time the buyer is to be let in on the mystery of what the difference between factory price and delivered price represents. Heretofore it has consisted largely of a fat profit for the dealer. The industry has long been in need of a debunking of the extra items for which the buyer pays. This Chevrolet proposes to do.

By eliminating many items for which a charge is not justified, Chevrolet has cut the average increase in cost of its 1934 car to $40, compared with an advance of $70 in the old "f.o.b." price. It is understood that Chevrolet's national advertising will carry no prices, the matter of pricing being left entirely in hands of local dealers. If Chevrolet's new policy is as successful as hoped for, it is likely that other General Motors divisions will follow suit, although it is reported that they are unwilling at this time to do so.

Ford production continues to expand, being well above 2500 units a day. Ford is getting considerable business on the strength of being able to make prompt deliveries, whereas at least one prominent low-price maker is quoting 30 days. Chevrolet reports on hand 85,000 retail orders and 150,000 orders for stocks for its 10,220 dealers. Plymouth has announced retail orders amounting to 42,775 cars.

The steel industry is not yet feeling much impetus from the automobile industry. Ford is expected to make a steel buy as usual in the final 10 days of January; its recent purchases were to take care of requirements necessitated by increased schedules. Chevrolet also should purchase some steel for its local plants before the month is out. However, it must be remembered that automotive users of steel still have large tonnages in stock and these must be reduced considerably before extensive fresh orders are placed.

Reports of impending increases in sheet prices for the second quarter, amounting to $2 a ton on hot-rolled sheets and $5 on hot-rolled annealed sheets and cold-rolled sheets, are worrying automotive companies which already are contemplating ordering large quantities of steel at present prices if an advance is announced. Steel mills are said to contend that the sharp advance in light gage sheets is essential because of further increases in labor costs.

Local brokers specializing in second sheets are buying every pound of material on which they can lay their hands in anticipation of a brisk demand shortly when steel users here need sheets quickly and the quality of the sheets will be secondary to the matter of rush delivery.

Parts makers, especially body plants and manufacturers of small parts, are being pushed by automobile companies for prompt shipments on current contracts. Far behind in filling orders, they are operating 24 hr. a day, and in some cases on Saturdays and Sundays. For the first time in months purchasing officials of automobile companies, in buying parts, are more interested in delivery dates than in prices. In fact, they are paying premiums to companies which will meet their delivery requirements.

Incidentally, the dislocation of labor during the depression is having its effects in Detroit at present. There is a reported shortage of metal finishers and polishers, and some metalworking plants are experiencing difficulty in securing skilled machine operators. The exigencies of the depression made it necessary to lay off many skilled men who have left the city in considerable numbers or drifted into other occupations.

LaSalle Motor Is Strictly a Cadillac Job

The straight eight engine in the 1934 LaSalle is not built by the Olds Motor Works as stated in this column on Jan. 11. It was designed by Cadillac engineers and is being manufactured in the local Cadillac plant which has been completely retooled for machining and assembly operations in connection with the new job.

Detroit Notes

Reo will shortly bring out a new Flying Cloud six . . . . Ford is understood to be making safety glass at the Rouge plant, purchasing the sheets of glass outside and performing the polishing, cutting and cementing operations at Dearborn. . . . Buick has put out inquiries for prices on parts for its small car to be introduced in the spring. . . . The machine tool market in Detroit is quiet with little likelihood of a renewal of activity until car production gets much heavier. . . . This sounds like a 1928 or 1929 story, but it happened in Detroit two weeks ago. A machine tool builder had so much work in its shop that it had to turn down an order for close to $100,000 worth of equipment because it couldn't make the desired deliveries.

Plans are under way to lift the Studebaker receivership. . . . Employment at Flint on Jan. 18 was as follows: Buick 12,382; Chevrolet 14,473; Fisher Body plant No. 1 4500; Fisher Body plant No. 2 800; AC Spark Plug 4621; DuPont 265. This represents an increase of 3000 since Jan. 1 and is the highest figure attained in Flint since 1930. . . . Dodge has spent $250,000 at its truck plant adding to production facilities, especially for increased manufacture of all-steel truck bodies. . . . The new Chevrolet weighs more than 3000 lb., or about 500 lb. more than in 1933. Most of the increase is in steel.

Industrial employment in Detroit on Jan. 15 stood at 75.1 compared with 61.7 on Jan. 1 and 52.2 on Jan. 15, 1933, according to the index of the Detroit Board of Commerce. This is the highest figure reached since May, 1931, and is exclusive of CWA enrollment. It is likely that the minimum output in the first quarter in the U. S. and Canada will be 600,000 units as against 368,106 units in the corresponding quarter of last year.

The Illinois Steel Co. has awarded a contract on an engineering basis to the Wilputte Coke Oven Corpn. for the rebuilding of two batteries of 70 ovens each of underfired by-product coke ovens at its Gary works.

Steel Output Tapers Following Stock Replenishment by Mills

Operations Dip to 32 Per Cent—Heavier Automotive Releases Raise Cleveland Rate—Stainless Steel Reduced—Scrap Higher

LACKING expected support from the automobile industry, the railroads and the building trades, steel business has tapered off in most market centers. While a moderate gain in automotive tonnage has driven up operations in the Cleveland district from 50 per cent to 54 per cent of capacity, there have been no other increases except a half point rise to 29½ per cent at Chicago. Losses have been rather sharp, including declines of three points to 21 per cent at Pittsburgh, six points to 30 per cent in the Valleys, and five points to 50 per cent in the Wheeling district. The national average, at 32 per cent, is one point lower than a week ago.

It is now clear that steel production, of late, has been sustained in part by replenishment of inventories. Any gains that are made from now on will more accurately reflect increases in steel consumption.

PROSPECTS of an early expansion of demand are restricted mainly to the automobile industry. Although motor car builders have not completely overcome their production difficulties, they are expected to release large tonnage orders within the next fortnight. Among the smaller steel-consuming industries, farm equipment and road machinery builders are taking more steel, and miscellaneous users generally appear to be reducing their steel stocks faster than they had expected.

But expectations remain unfilled so far as business from the railroads and the construction industry is concerned. Although orders for 20,000 freight cars are in prospect, including 12,775 on which the Van Sweringen roads took bids Monday, it is doubtful whether any of the resultant tonnage can reach the mills before March. Both car and rail programs have suffered delay after delay, largely because of complicated financial negotiations at Washington, with the result that considerable prospective business has apparently been postponed indefinitely. Whereas Government aid was originally expected to bring out orders for close to 850,000 tons of rails, it is now doubtful whether total purchases will amount to more than 450,000 tons. In the meantime releases against orders so far placed are slow in reaching producers, and the rail mills at Chicago and Pittsburgh remain idle.

THE ponderously slow operations of the Government are also holding back construction work. While a large part of the public works fund has been allocated, a relatively small proportion of the steel required for Government-financed projects has actually been placed with the mills.

Structural steel lettings, at 11,550 tons, compare with 9850 tons last week. New projects of 5450 tons compare with 14,250 tons last week and 5800 tons two weeks ago. Inquiries for fabricated plates total 5000 tons.

THE failure of mill operations to rise has forced producers to give renewed consideration to costs, since lack of volume in certain products will make losses inevitable. Price advances on sheets, ranging from $3 a ton on common finishes to $5 a ton on more highly finished grades, are reported to be a possibility.

Stainless steel, one of the newer products of the industry, has been lowered in price, evidently in the hope of bringing out an increase in consumption that will be more than compensatory. On 18-and-8 hot-rolled strip the reduction is 3½c. a lb.; on cold-rolled strip of the same analysis the cut is 3c. a lb.

The confused and disappointing situation in the finished steel market is not reflected by scrap prices. Increases at Chicago and Pittsburgh have driven up THE IRON AGE scrap composite from $11.83 to $12 a ton, its ninth consecutive weekly advance. THE IRON AGE composites for pig iron and finished steel are unchanged at $16.90 a ton and 2.028c. a lb. respectively.

ADDITIONS to prospective railroad purchases include 30,000 tons of rails and 10 all-steel passenger coaches for which the Boston & Maine has asked Federal financial aid and 25,000 tons of rails, 10,000 tons of track fastenings, 50 passenger cars and a stream-lined passenger train which will be bought by the New York, New Haven & Hartford. The Erie has put out inquiries for 125 passenger coaches and eight all-steel mail cars.

Contracts for 5280 tons of armor plate for four light cruisers have been placed by the Navy Department.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Jan. 23, 1934	Jan. 16, 1934	Dec. 26, 1933	Jan. 24, 1933
Per Gross Ton:				
No. 2 fdy., Philadelphia	$19.26	$19.26	$19.26	$13.34
No. 2, Valley furnace	17.50	17.50	17.50	14.50
No. 2 Southern, Cin'ti	18.13	18.13	18.13	13.82
No. 2, Birmingham†	13.50	13.50	13.50	11.00
No. 2 foundry, Chicago*	17.50	17.50	17.50	15.50
Basic, del'd eastern Pa.	18.76	18.76	18.76	13.50
Basic, Valley furnace	17.00	17.00	17.00	13.50
Valley Bessemer, del'd P'gh.	19.76	19.76	19.76	16.89
Malleable, Chicago*	17.50	17.50	17.50	15.50
Malleable, Valley	17.50	17.50	17.50	14.50
L. S. charcoal, Chicago	23.54	23.54	23.54	23.17
Ferromanganese, seab'd carlots	85.00	85.00	82.00	68.00

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$40.00
Light rails, Pittsburgh	32.00	32.00	32.00	30.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	26.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	26.00
Slabs, Pittsburgh	26.00	26.00	26.00	26.00
Forging billets, Pittsburgh	31.00	31.00	31.00	31.00
Wire rods, Pittsburgh	36.00	36.00	36.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.60

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.75	1.75	1.75	1.60
Bars, Chicago	1.80	1.80	1.80	1.70
Bars, Cleveland	1.80	1.80	1.80	1.65
Bars, New York	2.08	2.08	2.08	1.95
Plates, Pittsburgh	1.70	1.70	1.70	1.60
Plates, Chicago	1.75	1.75	1.75	1.70
Plates, New York	1.98	1.98	1.98	1.698
Structural shapes, Pittsburgh	1.70	1.70	1.70	1.60
Structural shapes, Chicago	1.75	1.75	1.75	1.70
Structural shapes, New York	1.95¼	1.95¼	1.95¼	1.86775
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.70
Hot-rolled strips, Pittsburgh	1.75	1.75	1.75	1.45
Cold-rolled strips, Pittsburgh	2.40	2.40	2.40	1.90

Finished Steel

	Jan. 23, 1934	Jan. 16, 1934	Dec. 26, 1933	Jan. 24, 1933
Per Lb.:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.25	2.25	2.25	2.00
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.35	2.35	2.35	2.10
Sheets, galv., No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, galv., No. 24, Chicago dist. mill	2.95	2.95	2.95	2.65
Hot-rolled sheets, No. 10, P'gh	1.75	1.75	1.75	1.45
Hot-rolled sheets, No. 10, Chicago dist. mill	1.85	1.85	1.85	1.55
Wire nails, Pittsburgh	2.35	2.35	2.35	1.80
Wire nails, Chicago dist. mill	2.40	2.40	2.40	1.85
Plain wire, Pittsburgh	2.20	2.20	2.20	2.10
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.15
Barbed wire, galv., P'gh	2.85	2.85	2.85	2.30
Barbed wire, galv., Chicago dist. mill	2.90	2.90	2.90	2.35
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$4.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	**$13.50**	$13.25	$12.50	$8.25
Heavy melting steel, Phila	11.75	11.75	11.00	6.75
Heavy melting steel, Ch'go	**10.75**	10.50	9.75	5.25
Carwheels, Chicago	11.00	11.00	10.00	7.75
Carwheels, Philadelphia	**12.75**	11.75	11.75	8.00
No. 1 cast, Pittsburgh	11.75	11.75	11.25	9.00
No. 1 cast, Philadelphia	12.50	12.50	12.50	8.00
No. 1 cast, Ch'go (net ton)	9.50	9.50	9.50	6.25
No. 1 RR. wrot., Phila	11.00	11.00	11.00	7.50
No. 1 RR. wrot., Ch'go (net)	**9.25**	9.00	8.50	4.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.50	$3.50	$3.75	$1.75
Foundry coke, prompt	4.25	4.25	4.25	2.50

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	**8.12½**	7.75	8.00	4.75
Lake copper, New York	**8.37½**	8.00	8.25	5.00
Tin (Straits), New York	*51.62½*	52.37½	52.87½	23.00
Zinc, East St. Louis	4.25	4.25	4.45	3.00
Zinc, New York	4.60	4.60	4.80	3.37
Lead, St. Louis	3.90	3.90	4.05	2.87½
Lead, New York	4.00	4.00	4.15	3.00
Antimony (Asiatic), N. Y.	7.20	7.20	7.25	5.80

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Jan. 23, 1934	2.028c. a Lb.	$16.90 a Gross Ton	$12.00 a Gross Ton
One week ago	2.028c.	16.90	11.83
One month ago	2.028c.	16.90	11.08
One year ago	1.923c.	13.56	6.75
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1933	2.036c., Oct. 3	1.867c., Apr. 18	$16.90, Dec. 5	$13.56, Jan. 3	$12.25, Aug. 8	$6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Production Slumps At Pittsburgh

Ingot Rate Falls to 21 Per Cent—Valley and Wheeling District Operations Also Decline—Melting Scrap Advances

PITTSBURGH, Jan. 23.—The recent surprisingly high steel operating rate in this and nearby districts has been rather abruptly checked, as finished steel releases have failed to keep pace with output. Large producers have built up their stocks of raw steel and some finished products to a level which appears to be sufficient to meet increased spring demand for steel products. While there is still a fairly good miscellaneous demand for finished steel, the failure of the three most important consuming industries to come into the market in a substantial way has resulted in a temporary lull in activity.

Steel ingot production in the Pittsburgh district this week will average only about 21 per cent of capacity, with a downward tendency very much in evidence. In the Valleys and nearby northern Ohio plants production has dropped to 30 per cent, while Wheeling district activity has declined to 50 per cent in spite of the support being given mills by comparatively heavy anticipatory tin plate production. Finishing mill schedules are intermittent, with sheet production alone showing any improvement.

The continued delay of railroad buying programs, apparently occasioned by financial negotiations at Washington, is proving particularly disappointing to Pittsburgh district mills. With orders for at least 20,000 freight cars in prospect, comparatively large tonnages of rails and track accessories scheduled to be placed as soon as details can be worked out, it now appears likely that the resultant tonnage cannot possibly affect operations before March.

Structural steel and reinforcing bar demand is also held in abeyance by the slow movements of the PWA, and demand for steel from the automobile industry seems to be handicapped by mechanical difficulties in the production of new models. Heavy demand from the agricultural regions in the West and South, which is expected as the result of generous Federal disbursements by the AAA, has not yet begun to be felt in this district. The outlook in the oil industry appears good, but heavy line pipe orders are not in prospect.

The situation is offered encouragement by the continued strength in the scrap market, although no sharp advances have occurred in the last week.

Pig Iron

No new buying is reported, and shipments are limited to the immediate needs of small consumers. Little talk of price changes in the near future is heard.

Semi-Finished Steel

Shipments are holding up better than had been anticipated this month, but little new buying is reported. The requirements of tin mills are naturally light, but non-integrated sheet and strip users are slightly more active.

Rails and Track Accessories

This market is without activity, depending on developments from Washington. Most of the carriers who are seeking funds from the PWA are awaiting final approval of their loans by the ICC. While the Pennsylvania's loan has been approved, no inquiry has yet appeared. Nevertheless, its funds will not be used for the purchase of rails or accessories. The local rail mill is inactive, and producers of track supplies are limiting their production schedules to the quiet current demand.

Bars

Movement of soft steel and alloy steel bars to the automotive industry has improved in the last week, and general demand is well sustained. Consumers in this territory do not appear to have stocked as many bars as had been anticipated, and many of them are ordering frequently for rush shipment. The reinforcing bar market is still rather quiet, with public works projects slow to take definite shape. Difficulties in the operation of the CWA in this district has not affected reinforcing bar demand materially.

Plates and Shapes

Structural steel awards continue rather light, and new jobs of sizable proportions are lacking. Competition on such jobs as are being placed is very keen, and fabricated prices have been forced to a low level in spite of the firm market on structural shapes. Plates are also rather dull, although makers are hopeful that large railroad car building programs will soon bring considerable tonnage to their mills.

Cold-Finished Steel Bars

Demand has improved slightly in the last week or two, but is still rather quiet with most makers. Automotive purchases are beginning to increase, but are still held back by difficulties in the production schedules of the principal automobile makers.

Bolts, Nuts and Rivets

Shipments this month are running considerably ahead of December, with demand fairly well distributed among the principal consuming industries. Automotive tonnage is just beginning to improve, and bolt and rivet makers are receiving large tentative inquiries from the railroad car builders. Prices are well maintained.

Tubular Products

With no heavy tonnage business before the trade, the market is being fairly well sustained by small miscellaneous orders for pipe. Prospects are extremely favorable in the mid-continent fields, where drilling activity is expected to increase gradually throughout the year. The prospect for line pipe tonnage, however, is not favorable.

Wire Products

This market continues exceptionally dull, principally because of the heavy shipments reported in December. A slight improvement in demand for manufacturers' wire is noticed, but nails, barbed wire and fencing are very dull. The improved sentiment in the farming districts of the South and West is expected to result in much heavier demand in the spring.

Strip Steel

With demand from the automotive industry only slightly improved, this market continues rather dull. However, January business has been heavier than most companies had anticipated, and production of both hot and cold-rolled strip is maintained at at least 25 per cent of capacity.

Tin Plate

Although demand is admittedly dull, the leading producer is still running at better than 50 per cent of capacity, and some of the independents are engaged at only a slightly lower rate. Stocks are being built up in some instances, and a part of the tonnage now being rolled is anticipatory.

Sheets

Business is gradually expanding, and improvement is reported from all of the principal consuming groups, except the jobbers. Automotive demand

is getting under way slowly so far as this district is concerned, but promises to be much better next month. A large tonnage of car roofing steel is in sight, but is slow to come out. Mill operations are somewhat stronger, averaging at least 35 per cent of capacity. Price advances on a majority of sheet mill products are being seriously considered by many makers.

Coal and Coke

Although coke buying has been rather active in the month to date, the last few days have been more quiet. The price reduction in furnace coke announced recently brought in little new tonnage, and the foundry grade is very quiet. The coal market is still affected by price uncertainty and labor unrest.

Scrap

Sale of a comparatively large tonnage of No. 1 heavy melting steel at $13.75 has advanced the scrap market slightly, although the general situation has not strengthened as much as in the week before. Dealers have made small offerings of steel at $13.50, but mills have become rather apathetic to renewed buying at this time. Scrap rails have been sold at $14, and the cast grades are particularly strong. This is partially attributable to the fact that steel companies that would be forced to pay high prices for pig iron are able to cheapen their melt substantially by using cast scrap. The blast furnace grades are quiet, and no sizable purchases of foundry scrap have been reported.

Detroit Scrap Mart Has Weaker Tone

DETROIT, Jan. 23.—Although local scrap quotations have not changed they are sympathetically weaker, because of relatively low prices paid by steel mills in other districts in the last few days. The Detroit district mill continues inactive as a buyer of scrap. Small quantities of old material are being shipped to Valley users by local dealers.

Superior Steel Workers Elect Representatives

THE Amalgamated Association of Iron, Steel and Tin Workers received 973 votes out of a total of 1069 at an election at the plant of the Superior Steel Corpn., Carnegie, Pa., to select representatives "for all purposes of collective bargaining," it has been announced by the National Labor Board, which supervised the election. Eighty-one votes were opposed to the association representatives and 15 ballots were spoiled.

Open Prices Do Not Mean High Prices, Says Steel Institute Secretary

PITTSBURGH, Jan. 23. — Neither price fixing nor universally higher prices for steel products are resulting from the open price provisions of the steel code, according to a statement by Walter S. Tower, executive secretary of the American Iron and Steel Institute, today at a meeting of steel men in this district to discuss and clarify various terms and provisions of the steel code. Mr. Tower cited the recent reduction in stainless steel prices and the fact that the average of all steel prices is still close to the lowest level in 20 years, as evidence that competition had not abated in the steel industry.

"The salvation of the steel industry and its ability to meet the heavily increased financial burden resulting from higher wages and more employment depend upon stable markets," said Mr. Tower. "The open price provisions should make an important contribution to stability, but they will not make for runaway markets or prevent declines. When it is realized that the direct outlay by the steel industry for wages, exclusive of salaries, from June to November showed an increase per ton of finished steel produced of 70 per cent, it becomes apparent that the industry has assumed a heavy responsibility. The total wages to mill labor in June averaged $13 a ton for finished steel, as compared to $22 a ton in November.

"A great deal of misconception exists about steel prices. It is not generally realized that steel prices reached their post-war peak in 1920. From that point there was an almost uninterrupted decline until the bottom was reached in the spring of 1933. From that time to the present there has been a relatively small advance in the average of steel prices, but less than the advance for general wholesale commodities, which are now about 20 per cent above the low level of 1933."

Sheet Shipments Up In December

SALES, production and shipments of sheet steel products in December reflected gains, according to the report of the National Association of Flat Rolled Steel Manufacturers, Pittsburgh. According to the survey, which is based on figures covering a monthly capacity of 325,000 net tons, or approximately 59 per cent of the country's total capacity of 550,000 net tons, independent makers reported sales of 110,263 net tons in December, compared with 88,354 tons in November; production of 113,111 tons, against 102,585 tons, and shipments of 111,867 tons, compared with 99,499 tons. Unfilled tonnage on Jan. 1 totaled 92,831 tons, or 28.6 per cent of capacity, compared with 94,270 tons, or 29.1 per cent of capacity in the preceding month.

The December report with comparisons of the two preceding months, in net tons, follows:

	Dec.	Nov.	Oct.
Sales	110,263	88,354	79,141
Production	113,111	102,585	146,106
Shipments	111,867	99,499	174,829
Unfilled orders	92,831	94,270	102,262
Unshipped orders	49,598	50,455	52,978
Unsold stocks	51,622	55,495	52,353
Capacity per month.	550,000	550,000	550,000
Percentage report'g.	59.0	59.0	59.0
Percentages, Based on Capacity			
Sales	34.0	27.2	24.4
Production	34.9	31.6	45.0
Shipments	34.5	30.7	53.9
Unfilled orders	28.6	29.1	31.5
Unshipped orders	15.3	15.5	16.3
Unsold stocks	15.9	17.1	16.1

Southern Market on Even Keel

BIRMINGHAM, Jan. 23.—The pig iron market is quiet, with only a limited amount of new business, as most foundries are amply stocked for this month. Sales, although light, have been somewhat better than was expected. Some foundries are mixing current iron with their lower-priced stock iron. Active stacks remain unchanged at nine and the base price continues at $13.50.

New business of the pressure pipe plants last week was slightly off, this being due to a drop in CWA orders. For five or six weeks pipe tonnage had showed a slight gain as a result of numerous small orders from CWA and PWA projects.

Steel

Steel tonnage has been coming in at a fair rate all month, but is considerably below the December volume. The current demand for wire products is considered satisfactory in view of the rush last month to buy before prices advanced.

Twelve open-hearth furnaces were worked last week, and this schedule has been maintained since the middle of December.

The operating rate of the steel industry for the week beginning Jan. 22 was 32.5 per cent, as compared with 34.2 per cent last week, according to the American Iron and Steel Institute.

Modine Manufacturing Co. has declared a dividend of 15 cents a share on its common stock. This is the first payment since Feb. 1, 1933, when a similar disbursement was made.

Chicago Ingot Output Gain a Half a Point

Rate Is Now 29½ Per Cent—Rail Buying Is Disappointing But Mills Are Counting on Car Tonnage—Scrap Up

CHICAGO, Jan. 23.—Only minor changes mark the Chicago district iron and steel market. Ingot output has risen one-half point to 29½ per cent of capacity and while mills look for further gains in production they hesitate to paint too optimistic a picture for the immediate future.

They are counting heavily on car building programs, but they are ready to admit that they can now see only one-half the rail business estimated as a certainty late last fall. Government money is expected to give added support to structural shops, but private work shows no material gain from last year, when building permits in Chicago were the lowest in 60 years. On the whole, current specifications are showing little change except for a gain in releases from farm implement manufacturers, who are lifting production, especially on tractors.

Forward buying remains relatively steady but in low volume, and gross tonnages added to mill books for delivery in the first quarter are not heavy.

On the other hand, inquiry for scrap specialties is better and the whole price structure in that market is more buoyant than at any time this month. Heavy melting steel has moved up 50c. a ton.

In finished steel, advances of $3 to $5 a ton on sheet mill products are being considered.

Pig Iron

Shipments of Northern iron are at only about half the December rate, a condition fully expected by sellers. However, there are buyers who took heavy shipments in December who are again in the market, indicating that in some cases consumer stock piles are dwindling faster than had been expected. Throughout Michigan, foundries engaged on automobile work are rapidly speeding up production.

Coke

By-product foundry coke is moving in larger volume at Milwaukee and in lighter tonnage in Chicago. The situation at Chicago is explained by heavy shipments made late in the old year on a few remaining long-time contracts. On the whole, shipments reflect a steady increase in melt. Opinion leans to the viewpoint that February prices will remain unchanged.

Reinforcing Bars

Most of the activity in reinforcing bars is taking place in Louisiana, where 3600 tons has been bought for a bridge and 800 tons was ordered for an industrial plant. Local fabricators have had to be contented with 250 tons for Illinois road work. This State will open bids near the end of the month on another batch of small paving jobs. Bids have been opened on 700 tons for the Sanitary District sewer, but the selection of the contractor has not been announced. Bending shops have fair order books and are operating close to 50 per cent of capacity.

Cast Iron Pipe

An inquiry from Chicago for eight 48-in. valves sums up activity in this market except for a few scattered small lots of pipe. No doubt the season encourages users to postpone placing orders, but another factor is a slowing up of CWA projects either because of delay in distributing funds or an actual lack of funds. Fresh inquiry has practically disappeared from the mails.

Wire Products

Output remains stationary at 35 per cent of capacity. General manufacturing is steady, with prospects considered good. The outlook for rural trade is also favorable. Utilities are buying copper wire sparingly, but inquiries point to better demand as soon as spring weather sets in. Forward buying continues at a steady but slow rate.

Sheets

There is growing sentiment among sellers for a general advance in prices ranging from $3 a ton on common grades to $5 a ton on the more highly finished grades. So far as can be learned, higher prices have not actually been filed, though it is intimated that this move may take place in the very near future. Demand remains at rather a low rate and sheet mills are not producing above 45 per cent of capacity. As yet automobile manufacturers are drawing little tonnage from this district.

Rails and Track Supplies

Another quiet week in the rail market has brought most producers around to the view that the buying program as outlined last fall is destined to be more or less of a failure. At one time it was estimated that the railroads would purchase close to 850,000 tons of rails and mills are now revising this figure downward to about 450,000 tons. Two Western railroads are near the point of closing. In the meantime specifications are absent and neither rail mill in Chicago is producing. Demand for light rails is spotty and shipments are very light.

Plates

Of outstanding interest in the plate market is an inquiry from the Milwaukee Sewage Commission for about 200 tons of stainless steel clad pipe that will be used for a main air header. Fabricators have taken orders for two dams across the Mississippi River and bids on the Bellevue, Iowa, dam were opened Tuesday. Railroad shop work is dragging and tank shops, lacking the support of brewery work, find business dull. The brightest spots appearing in the future are pending railroad car building programs, which, as now planned, call for 170,000 tons of steel, exclusive of wheels and axles.

Structural Material

Awards in this district, at 5800 tons, are bolstered by 2300 tons for two dams across the Mississippi River. One lone project, calling for 100 tons, marks the extent of private work. Inquiries are light at 2600 tons, but in this list two private jobs call for 400 tons. The general situation is well illustrated by the fact that building permits in Chicago in the past year were the lowest in 60 years.

Bars

A feature of this market is the slowly but surely expanding use of steel by tractor manufacturers, who are again moving their product into agricultural districts. There is also moderate gain in production of other farm implements and there is no lessening in the optimism of manufacturers in this field. Road machinery builders, now holding a show in Chicago, have fair schedules, which have held steady for many months. Only light tonnages of bar mill sizes will be used in cars to be built by the railroads.

Scrap

Whatever hesitancy there may have been in the scrap market a week ago has disappeared and prices are once again on their upward march. Heavy melting steel has advanced 50c. a ton to $11 a gross ton, delivered, and some specialties are following this leader. Shipments to mills are lighter as buyers restrict acceptances following efforts of brokers to ship ahead of quotas.

Output Rises to 54 Per Cent at Cleveland

Ingot Rate Is Highest Since September — Automotive Demand Improves — Van Sweringen Roads Take Bids on 12,775 Cars

CLEVELAND, Jan. 23.—Ingot output in the Cleveland-Lorain territory increased four points this week to 54 per cent of capacity, two local steel plants each putting on an additional open-hearth furnace. This is the highest operating rate since early last September.

A steady and slightly increasing demand for finished steel from the automotive industry has enabled the steel plants to step up their production. Miscellaneous orders for steel bars show a slight gain, and some consumers are reaching the end of stocks accumulated last month, better operations having enabled them to use up the steel faster than they had expected. Others will not need to buy additional steel in bars, shapes and plates for several weeks.

Sentiment in the steel industry and among consumers continues very optimistic. Large tonnage buying by the automotive industry, which has been held up by delays in getting in production on new models, is expected to materialize in about two weeks. Bids for the 12,775 freight cars for the Chesapeake & Ohio, Erie and Nickel Plate railroads were taken Monday and the awards of these car orders is expected to start as soon as the bids are tabulated, which will take several days.

Bolt and nut business has been stimulated considerably by orders from the automotive industry, and this has resulted in quite an improvement in the demand for manufacturers' wire.

Pig Iron

The market is showing more life than for some time. A leading interest sold 6000 tons during the week, mostly to foundries making automotive castings. Included were two lots in excess of 1000 tons each. General Motors Corpn. still has a large stock of iron that was shipped by water to its Saginaw, Mich., foundries late last year and is not expected to make any new purchases before May.

Iron Ore

Consumption of Lake Superior ore in December was 1,597,680 tons, a gain of 137,643 tons over November. This compares with 630,115 tons used in December, 1932. Furnace stocks Jan. 1 were 29,346,475 tons and ore at furnaces and docks on that date amounted to 34,673,149 tons as against 31,489,671 tons at the start of 1933. Central District furnaces in December used 870,457 tons, a gain of 86,121 tons. Lake front furnaces melted 714,478 tons, an increase of 49,952 tons. Eastern furnaces used 4884 tons, a gain of 1318 tons, and all-rail furnaces used 5861 tons, an increase of 252 tons. There were 64 furnaces using Lake ore in blast Dec. 31, a gain of six for the month.

Sheets

The recent improvement in the demand from the automotive industry is being maintained and considerable increase in tonnage from this source is expected within the next week or two. With the automotive tonnage several Ohio sheet mills are able to maintain good operations, although they would welcome additional business. Several good orders were placed during the week by stove manufacturers, who look for a good spring business.

Strip Steel

Demand shows a little improvement. While round-lot orders are not coming from the automotive industry, some fill-in orders are being placed by makers of automobile parts and there is a fair volume of miscellaneous carlot business from stamping plants in this territory, much of the material being for automobile stampings.

Bolts, Nuts and Rivets

Bolt and nut business shows improvement. Some substantial orders came from the automotive industry during the past few days, and there is a gain in demand from railroads and from miscellaneous manufacturing industries. Jobbers are still quiet. The industry is operating at about 35 per cent of capacity. Demand for rivets is slow. Central Western makers have not shared in recent shipyard business, which went to Eastern producers. However, pending car orders will prove a stimulus to demand.

Bars, Plates and Shapes

Agricultural implement manufacturers and builders of road machinery are getting somewhat busier and this activity is bringing out new business in steel bars. Local forge shops also have improved operations due to miscellaneous demand, mostly outside the automotive field. Structural lettings are scarce. A building at Wright Air Feld, Dayton, will take 290 tons of structural shapes. The present demand for plates is rather slow. Ohio will take new bids Feb. 2 on considerable highway work requiring reinforcing bars.

Scrap

The market continues very firm with no change in prices. Consumers have considerable scrap due on recently placed contracts and they are taking this freely without restricting shipments. No new consumer purchases were made during the week. Dealers are buying scrap against outstanding orders and claim to have no trouble in covering at current prices.

Government Job Is High Light at St. Louis

ST. LOUIS, Jan. 23.—Buying of finished steel has tapered off considerably during the last few weeks. This was to be expected following the heavy specifying that occurred during December.

The Falstaff Brewery, St. Louis, will build an addition to its plant, requiring 100 tons of structural steel. The United States Engineer's office at Kansas City will open bids Feb. 2 for dredge boats and pontoons, requiring 4000 tons of structurals.

Shipments and orders of pig iron have been light. Melters took in more iron than usual during December in order to take advantage of expiring low-price contracts.

Scrap business amounted to almost nothing last week, because dealers were absent at the convention of the Scrap Iron Institute in Atlantic City. Prices are unchanged.

Scrap Firm, Pig Iron Quiet at Boston

BOSTON, Jan. 23.—Pig iron sales in this territory are few and confined to small tonnages. The aggregate for the week again fell below 1000 tons. With textile machinery manufacturers less active, New England melt has dropped to around 20 per cent of rated capacity.

Scrap prices are very firm. No. 1 heavy melting steel for Pittsburgh district delivery sold the past week in small lots at $7.25 a ton on cars shipping point, with an occasional transaction at $6.75 and $7. The American Steel & Wire Co., Worcester, Mass., is offering $6.50 a ton, delivered, for round bundled skeleton tonnages, which means $4.50 to $4.75 on cars here. For export, No. 2 steel is quoted at $5.50 to $6 a ton delivered here, and is the most active of all grades. There is a moderate demand for breakable cast at $6 to $6.50 a ton on cars shipping point, and for cleaned engine blocks at $8 to $8.50 a ton delivered locally.

Operations Maintained in Philadelphia Zone

Ingot Output Holds at 25 Per Cent—Mild Upturn in Miscellaneous Demand —Business Prospects Are Favorable

PHILADELPHIA, Jan. 23.—While the iron and steel market in this territory remains quiet, the past week reflected a mild upturn in miscellaneous demand for pig iron, plates and sheets. Sentiment in the trade is cheerful over prospective business in the early future.

This is especially true of railroad requirements. The Pennsylvania likely will ask for bids this week or soon after for the steel required for 6500 freight cars and 101 electric locomotives to be built with funds from a PWA loan which has been approved by the Interstate Commerce Commission.

It is also expected that demand soon will be substantially stimulated from public works requirements, which are beginning to reach the stage where volume tonnage will be needed.

There has been a slight spurt in pig iron inquiries, though large tonnages are not expected until after melters have absorbed stocks which were accumulated in December when shipments against contracts were heavy.

The scrap market is rather dull but firm, with several grades moving in small quantities at higher prices.

Open-hearth furnace operations remain unchanged at 25 per cent of capacity.

Pig Iron

Several inquiries for lots ranging from 200 to 500 tons of foundry grades have come out the past week. The melt has increased slightly, but stocks laid in last December still are rather large and until they are used up no large requirements are expected to develop.

Plates, Shapes and Bars

The chief interest in the trade is in the forthcoming inquiry of the Pennsylvania Railroad for steel for 6500 freight cars and 101 electric locomotives to be purchased with PWA funds. It is expected that bids under the Clayton act will be put out either this week or early next week. The actual tonnage requirements have not been estimated but will be large, especially for plates, shapes and sheets, with goodly lots of bars. The Pennsylvania will build the cars in its shops at Altonna, Enola and Pitcairn, Pa., and also will build some of the locomotives in its own shops. The trade also is looking for an early inflow of tonnage for public works projects. There will be comparatively small requirements for heavy structural material, however. The steel for the Philadelphia approach of the Delaware river bridge, amounting to 1500 tons, is expected to be placed soon.

Imports

The following iron and steel imports were received here last week: 1700 tons of pig iron from the Netherlands and 1000 tons of the same product from British India, 63 tons of steel tubes and 31 tons of steel bars from Sweden, and 25 tons of tungsten ore from China.

Warehouse Business

Some jobbers report that business is holding about even with that of December, and in instances is registering a small increase. Other warehouse dealers report a mild decline in demand. Prices remain unchanged.

Sheets

Inquiry generally is light, but some mills report an upturn in demand for miscellaneous lots. Automotive sheet demand for new models has not yet

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reached this district to any considerable extent, while requirements from stove makers are low, as is usual for this season of the year. Radio makers likewise are not active in the market.

Scrap

The market is quiet but firm and several grades have moved up in price on the basis of small sales. Temporarily shipments of No. 1 heavy melting steel have been held up by one mill but indications are that operations soon will be stepped up and shipments resumed.

Steel Bookings Continue To Drag at New York

Railroad Buying Delayed — New Haven to Take Bids on 50 Passenger Cars—Stainless Steel Prices Reduced

NEW YORK, Jan. 23.—Steel bookings in this territory remain at a low level. Expected tonnage from the railroads and the construction industry is slow in materializing. Part of the delay is due to Government red tape and some of it is attributable to various code complications. In certain instances railroads are reluctant to place orders for equipment or equipment repairs, because of the high cost entailed. Under the terms of PWA loans all equipment construction work must be done at considerably higher wage rates than prevail in railroad shops or in the plants of car and locomotive builders. Another factor that is holding up railroad purchases is the inexperience of mills in quoting under the terms of commercial resolutions Nos. 29 and 38. Bids on 10,000 to 11,000 tons of bars, plates, shapes, sheets and other products taken by the New York Central last week contained so many errors in the computation of mileage and other allowances that all tenders except possibly on bolts and nuts are reported to have been rejected.

The New York Central is expected to come into the market for 40,000 tons of rails, together with fastenings, some time next month. The New York, New Haven & Hartford will take figures on 50 all-steel passenger cars Jan. 29 and will soon inquire for 25,000 tons of rails and 10,000 tons of track supplies. The Lehigh Valley will buy five locomotives.

In view of continued losses at the present low rate of operations, sheet producers may soon announce an advance in prices. It is possible that the increases will be limited to full-finished sheets. At any rate the heavier gages will probably be excepted, since they are much less affected by advances in labor costs than other grades.

The Soviet Union contemplates purchasing 50,000 tons of steel pipe, of which 20,000 tons may be placed in this country. Early action on this tonnage is improbable in view of difficulties in making financial arrangements.

Lower prices have been filed on stainless strip steel in both 18-and-8 and 16-and-6 classifications. The reduction on hot-rolled strip is 3½c. a lb. and on cold-rolled strip 3c. a lb. The new base prices on 18-and-8 are 20c. a lb., Pittsburgh, for hot strip and 27c. for cold strip. The quotations on 16-and-6 are 3c. a lb. lower than those on 18-and-8.

Pig Iron

A number of plant foundries casting heavy machine parts have stepped up operations, and the current melting schedules of jobbing foundries in the Brooklyn, N. Y., district is somewhat heavier. The district's aggregate volume of melt is, however, still under 25 per cent of capacity. Despite the slightly better market tone, selling continues to be limited to scattered fill-in carlots, and the present well stocked condition of most yards precludes the appearance of important purchasing for at least another month. The week's sales totaled about 1400 tons, compared with 1400 tons sold the previous week, and 1500 tons booked a fortnight ago. There is no substantial inquiry in the present market, but one large furnace is reported to have quietly booked an attractive tonnage from a large New Jersey consumer.

Reinforcing Steel

Fresh buying in this district is very meager, and the only market support is from public structures outside the Metropolitan area. Carroll-McCreary & Co., Inc., will supply 400 tons of bars for a State hospital in Rockland County, N. Y., and Kalman Steel Corpn. was awarded 125 tons for bridges in Suffolk County, N. Y. New York State will open bids on Friday for 800 tons of bars and 200 tons of mesh for miscellaneous highways and structures, and the 300-ton Tri-Borough Bridge award is expected within a week. In addition, local distributers anticipate an early award of 1000 tons for bridge approaches at Philadelphia and Weymouth, Mass.

Scrap

There is a general disposition among mills to temporarily hold up shipments and the domestic market is consequently unsettled, but quotations on active grades in this district have again found support in active purchases for export. The price on barge for No. 1 heavy melting steel is strong at $9 at ton, but $7.50, New York, is now the best open offering available for car loading. A similar price spread of $6 to $7.50 a ton is in force for No. 2 steel. Sales of specialties are in better volume, and machine shop turnings are 75c. higher at $3.75 a ton. All cast grades are stronger, and advances in local delivered prices have exceeded $2 a ton. The recent activity in steel is not reflected in rolling mill and blast furnace grades, and current trading is unimportant. Garson Iron & Steel Co. bought 1700 cars and locomotives from the Norfolk Southern Railroad. About $8.10 a gross ton was paid, and the material will probably be shipped to Norfolk, Va., for export.

Constructive Work Less Active on Coast

SAN FRANCISCO, Jan. 22. — The lull in the market continues for the third consecutive week and seems to await resumption of Federal activity. Although a number of major projects are expected to materialize shortly, the present limited demand is for lesser tonnages. Ingot output on the Coast is below that prevailing at the close of the last quarter, and pig iron production at Provo, Utah, is 50 per cent of capacity.

Structural steel bookings during the week totaled but 1340 tons. McClintic-Marshall Corpn. took 555 tons for two bridges over the Eel River, and 100 tons for caissons on the Trans-Bay bridge at San Francisco went to Moore Dry Dock Co. Reinforcing bar awards, aggregating 406 tons, were less than for any week in the last five months.

Recent bids for the Railway Avenue seawall at Seattle were rejected and the work will be done by force account. The city will purchase 3614 tons of sheet piling and 1754 tons of reinforcing bars in the open market. The Chicago Bridge & Iron Co. submitted the low bid to the Bureau of Reclamation at Denver for siphons on the Owyhee project. Specifications call for 900 tons of plates.

Copper Rises to 8.37½c., Valley, as Trade Anticipates Acceptance of Code

Bookings of Prime Western for the Week Total 10,000 Tons

Lead Moderately Active at 4c.—Tin Trading Negligible

NEW YORK, Jan. 23.—More favorable prospects for an early code agreement are reflected in the improved position of electrolytic copper, which has thrown off most of the price weakness which has prevailed during the past two months. Good accounts are available into June at 8.37½c., although premiums are being asked in all directions for deliveries further forward. A good proportion of the recent purchasing activity was confined to subsidiary transactions, although bookings of independents were in good volume. Current shipments are comparatively satisfactory, but general expectation of early code acceptance is having a quieting effect on the market. Copper is encountering good demands abroad at prices ranging from 8.30c. to 8.37½c. a lb., c.i.f. usual Continental base ports. Foreign buyers are carefully watching code developments here in order to gage their trading attitude.

Tin

Most consumers are working their large stocks and are ignoring the present market despite the favorable factor of slow price movements. Straits and refined grades are now priced somewhat lower at 51.62½c. a lb., New York, but trading is wholly confined to a few professional parcels. The English market is more active, and liberal supplies are available as a result of steady liquidation of the residue of pool holdings. London postings on first call today were £227 12s. 6d. for spot and £227 5s. for future standard, and £230 10s. for Singapore Straits. United Kingdom warehouse stocks are now 8647 tons, compared with visible supplies of 28,896 tons a year ago.

Zinc

Spelter bookings rapidly climbed to 10,000 tons last week, compared with 2600 tons sold in the previous period. A 4.25c. price was the ruling quotation for most of the tonnage. A five point rise the latter part of the week failed to receive adequate consumer support, and the quotable position irregularly declined to the present basis of 4.60c. a lb., New York, and 4.25c., East St. Louis. Major interests have accumulated sizable books of new business, and are consequently not inclined to press metal on the market at 4.25c. The price tone is, therefore, quite firm, despite the weakening effect of continued overproduction in the Tri-State ore fields. Joplin concentrates are unchanged at $25 a ton, and stocks rose 1000 tons last week to the high position of 17,000 tons. The low ore price has forced several mines to reduce wages and hours, and one company has suspended operations. If this policy is extended, the statistical correction may be sufficient to strengthen the market for refined metal.

Lead

Consumers spiritedly covered their underbought position last week, and leading smelters are currently moving ore intake equivalents despite the less active condition of the present market. Practically all of January is sold, February requirements are about 60 per cent covered, and a few quiet March commitments have been made, although that month's books are not yet officially open. Most buyers recognize 4c. lead as a good investment, and it is only the disappointing statistical position which is preventing quotations from advancing beyond the present firm basis of 4c. a lb., New York, and 3.90c., St. Louis. December output was 41,300 tons, and 26,000 tons was shipped. Smelters' stocks as of Jan. 1 totaled 203,000 tons, which was a 15,200-ton increase as compared with Nov. 30. The present surplus is the largest reported for a number of years, but the trade is hoping that the downward trend of shipments will soon be reversed and thereby partially correct the present production-consumption unbalance.

Brass and Bronze Ingots

The combined December deliveries of brass and bronze ingots and billets by the members of the Non-Ferrous Ingot Metal Institute totaled 2145 tons. On Jan. 1. unfilled orders aggregated 14,447 net tons.

Charles W. Holman has sold his interest in the Gammons-Holman Co., Manchester, Conn., manufacturer of taper pin reamers, helical end mills and helical chucking reamers, to Mrs. Susan Gammons, president of the corporation, which was formed in 1919.

The Week's Prices. Cents Per Pound for Early Delivery

	Jan. 17	Jan. 18	Jan. 19	Jan. 20	Jan. 22	Jan. 23
Electrolytic copper, N. Y.*	7.75	8.00	8.12½	8.12½	8.12½	8.12½
Lake copper, N. Y.	8.00	8.25	8.37½	8.37½	8.37½	8.37½
Straits tin, Spot, N. Y.	52.00	51.25	52.00	....	51.62½	51.62½
Zinc, East St. Louis	4.25	4.30	4.30	4.25	4.25	4.25
Zinc, New York	4.60	4.65	4.65	4.60	4.60	4.60
Lead, St. Louis	3.90	3.90	3.90	3.90	3.90	3.90
Lead, New York	4.00	4.00	4.00	4.00	4.00	4.00

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98-99 per cent, 22.90c. a lb., delivered; New No. 12, 18.50c. a lb., delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 12c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 7.20c. a lb., New York.
Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits Pig	53.50c. to 54.50c.
Tin, bar	55.50c. to 56.50c.
Copper, Lake	9.75c. to 10.50c.
Copper, electrolytic	9.50c. to 10.00c.
Copper, castings	9.25c. to 10.25c.
*Copper sheets, hot-rolled	15.00c.
*High brass sheets	13.75c.
*Seamless brass tubes	16.25c.
*Seamless copper tubes	16.25c.
*Brass rods	12.25c.
Zinc, slabs	5.75c. to 6.75c.
Zinc sheets (No. 9), casks	9.75c. to 10.00c.
Lead, American pig	4.75c. to 5.75c.
Lead, bar	5.75c. to 6.75c.
Lead, sheets	7.50c. to 7.75c.
Antimony, Asiatic	8.75c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	32.00c. to 33.00c.
Babbitt metal, commercial grade	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.00c.
Tin, bar	57.00c.
Copper, Lake	9.00c.
Copper, electrolytic	9.00c.
Copper, castings	8.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	5.00c. to 5.25c.
Lead, bar	8.00c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	60.50c.
Solder, ½ and ½	33.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.50c.	7.25c.
Copper, hvy. and wire	6.25c.	7.00c.
Copper, light and bottoms	5.25c.	6.25c.
Brass, heavy	3.50c.	4.25c.
Brass, light	3.00c.	3.625c.
Hvy. machine composition	4.75c.	5.625c.
No. 1 yel. brass turnings	4.25c.	5.125c.
No. 1 red brass or compos. turnings	4.25c.	5.25c.
Lead, heavy	3.00c.	3.625c.
Zinc	2.50c.	3.125c.
Cast aluminum	7.75c.	9.00c.
Sheet aluminum	11.50c.	12.75c.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

	Soft Steel	*Base per Lb.*
F.o.b. Pittsburgh mill		1.75c
F.o.b. Chicago or Gary		1.80c.
Del'd Philadelphia		2.04c.
Del'd New York		2.08c.
F.o.b. Cleveland		1.80c.
F.o.b. Buffalo		1.85c.
F.o.b. Birmingham		1.90c.
F.o.b. cars dock Pacific ports		2.30c.
F.o.b. cars dock Gulf ports		2.15c.

Rail Steel
(For merchant trade)

F.o.b. Cleveland	1.70c.
F.o.b. Chicago	1.70c.
F.o.b. Gary	1.70c.
F.o.b. Pittsburgh	1.65c.
F.o.b. Buffalo	1.75c.
F.o.b. Birmingham	1.80c

Billet Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. P'gh mills	1.90c.
F.o.b. Birmingham	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. cars dock Pacific ports	2.45c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. Chicago	1.95c.

Rail Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. Pittsburgh	1.75c.
F.o.b. Cleveland	1.80c.
F.o.b. Chicago	1.80c.

Iron

Common iron, f.o.b. Terre Haute, Ind.	1.60c. to 1.75c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.89c.
Common iron del'd New York	1.93c.

Steel Car Axles

F.o.b. Pittsburgh	2.50c.
F.o.b. Chicago	2.50c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Birmingham	1.85c.
Del'd Cleveland	1.885c.
Del'd Philadelphia	1.885c.
F.o.b. Coatesville	1.80c.
F.o.b. Sparrows Point	1.80c.
Del'd New York	1.98c.
F.o.b. dock cars Pacific ports	2.25c
F.o.b. cars dock, Gulf ports	2.10c
Wrought iron plates, f.o.b. P'gh	3.00c

Floor Plates

F.o.b. Pittsburgh	3.20c.
F.o.b. Chicago	3.25c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.
F.o.b. Buffalo	1.80c.
F.o.b. Bethlehem	1.80c.
Del'd Cleveland	1.885c.
Del'd Philadelphia	1.905c.
Del'd New York	1.9525c.
F.o.b. cars dock, Gulf ports	2.10c.
F.o.b. dock cars Pacific ports (standard)	2.25c.
F.o.b. dock cars Pacific ports (wide flange)	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.00c.
F.o.b. Chicago mill	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base..2.45c. a lb. except at Bethlehem where the price is 2.55c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Cold Finished Bars*

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.15c.
Bars, Cleveland	2.15c.
Bars, Buffalo	2.20c.
Bars, Detroit	2.30c.
Bars, eastern Michigan	2.35c.
Shafting, ground, f.o.b. mill, 1⅛ in.	3.40c.
1-3/16 to 1½ in.	2.90c.
1-9/16 to 1⅞ in.	2.75c.
1-15/16 to 2⅜ in.	2.60c.
2-15/16 to 6 in.	2.45c.

* In quantities of 10,000 to 19,000 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.75c.
No. 10, f.o.b. Gary	1.85c.
No. 10, del'd Phila.	2.04c.
No. 10, f.o.b. Birmingham	1.90c.
No. 10, f.o.b. dock cars Pacific ports	2.42½c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.25c.
No. 24, f.o.b. Gary	2.35c.
No. 24, del'd Phila.	2.54c.
No. 24, f.o.b. Birmingham	2.40c.
No. 24, f.o.b. dock cars Pacific ports	2.95c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.30c.
No. 10 gage, f.o.b. Gary	2.40c.
No. 10 gage, del'd Phila.	2.59c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.00c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.75c.
No. 20 gage, f.o.b. Gary	2.85c.
No. 20 gage, del'd Phila.	3.04c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.45c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Gary	2.95c.
No. 24, del'd Phila.	3.14c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, f.o.b. dock cars Pacific ports	3.55c.
No. 24 Wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.25c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.65c.
No. 28, Gary	2.75c.

Tin Plate *Base per Box*

Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.80

Terne Plate
(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.75c.
All widths up to 24 in., Chicago	1.85c.
Cooperage stock, Pittsburgh	1.85c.
Cooperage stock, Chicago	1.95c.

Cold-Rolled Strips

F.o.b. Pittsburgh	2.40c.
F.o.b. Cleveland	2.40c.
Del'd Chicago	2.68c.
F.o.b. Worcester	2.60c.

Fender Stock

No. 20, Pittsburgh or Cleveland	3.10c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

Extras of 10c. a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. An allowance of $2 a ton is made to jobbers on straight, mixed or joint carloads; $3 a ton is allowed on less-than-carload shipments.

	Base per Keg
Standard wire nails	$2.35
Smooth coated nails	2.35
Galvanized nails:	
15 gage and coarser	4.35
16 gage and finer	4.85
	Base per 100 Lb.
Smooth annealed wire	$2.35
Smooth galvanized wire	2.70
Polished staples	3.05
Galvanized staples	3.30
Barbed wire, galvanized	2.85
Woven wire fence, base column	60.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Wrought Iron Inches	Wrought Iron Black	Wrought Iron Galv.
⅛	51½	29½	⅛	+91½	+138
¼ to ⅜	57	38½	¼ & ⅜	+11½	+21½
½	62	50½	½	31½	15
¾	65½	55½	¾	36½	20½
1 to 3	67½	58½	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	63½	54½	2	37	22½
2½ to 3	66½	57½	2½ to 3½	38	25
3½ to 6	68½	59½	4 to 8	40	28½
7 and 8	67½	57½	9 to 12	38	24½
9 and 10	67	57			
11 and 12	66	56			

Butt Weld, extra strong, plain ends

⅛	48½	33½	⅛	+13	+45½
¼ to ⅜	54½	41½	¼ & ⅜	+24½	+34½
½	60	51	½	32½	17½
¾	64½	55½	¾	37½	22½
1 to 3	66½	58½	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	61½	53½	2	40	26
2½ to 3	65½	57½	2½ to 4	45½	33
3½ to 6	69	61	4½ to 6	45	32½
7 and 8	68	58	7 & 8	46	33
9 and 10	67	57	9 to 12	41½	30
11 and 12	66	56			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base 2½ points less. The Chicago is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	33	1½ in.—1¾ in.	44
2½ in.—2¾ in.	40	2 in.—2¼ in.	13
3 in.	44	2½ in.—2¾ in.	16
3¼ in.—3½ in.	47	3 in.	17
4 in.	49	3¼ in. to 3½ in.	18
4½ in. to 6 in.	42	4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five. Exception: On 1½ to 1¾-in. charcoal iron tubes no supplementary discounts are granted, and the discount for 10,000 lb. to a carload is 4 points under base and for less than 10,000 lb. 8 points under base.

Standard Commercial Seamless Boiler Tubes
Cold-Drawn

1 in.	68	3 in.	38
1¼ to 1½ in.	68	3¼ to 3½ in.	41
1¾ in.	68	4 in.	43
2 to 2¼ in.	27	4½, 5 and 6 in.	36
2½ to 2¾ in.	34		

Hot-Rolled

2 and 2¼ in.	33	3¼ to 3½ in.	47
2½ and 2¾ in.	40	4 in.	49
3 in.	44	4½, 5 and 6 in.	42

In the case of all sizes except 1-in. to 1¾-in. cold-drawn boiler tubes supplementary discounts of two 5 per cents are allowed on carload lots. On quantities up to 10,000 lb. the base discount is reduced 10 points and a supplementary discount of 5 per cent only is allowed. On quantities 10,000 lb. to 24,999 lb. the base discount is reduced 6 points and a supplementary discount of 5 per cent only is allowed. On 25,000 lb. to a carload the base discount is reduced 2 points and supplementary discounts of two 5 per cents are allowed.

On 1 to 1¾-in. cold-drawn boiler tubes, there are no supplementary discounts. On quantities up to 10,000 lb. the base discount is reduced 12 points; on 10,000 lb. to 24,999 lb., it is reduced 8 points; on 25,000 lb. to a carload it is reduced 2 points

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 3.30% to 40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, 60-lb. and heavier, per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$32.00
Light rails (from rail steel) per gross ton	31.00

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.40
Spikes, ½ in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates, steel	1.90
Track bolts, to steam railroads	3.55
Track bolts, to jobbers, all sizes (per 100 count)	70 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	70, 25 and 10
Stove bolts in packages, Ch'go.	70, 25 and 10
Stove bolts in packages, Cleveland,	70, 25 and 10
Stove bolts in bulk, P'gh	85
Stove bolts in bulk, Chicago	85
Stove bolts in bulk, Cleveland	85
Tire bolts	60

Large Rivets
(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago and Birmingham	2.85

Small Rivets
(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago and Birm'g'm	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 180 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screw, 1 in. dia. and smaller	75, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screw, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	85
Upset set screws cut and oval point	75 and 10
Milled studs	65 and 5

STAINLESS STEEL

(18% Cr. 8% Ni. 0.08 to 0.12% C)
(Base Prices, f.o.b. Pittsburgh)

	Per Lb.
Bars	25c.
Plates	26c.
Sheets	35c.
Hot-rolled strip	20c.
Cold-rolled strip	27c.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Youngstown, Chicago, Gary, Buffalo, Cleveland, Birmingham.

	Per Gross Ton
Rerolling	$26.00
Forging quality	$1.00

Sheet Bars

F.o.b. Pittsburgh, Youngstown, Cleveland, Chicago, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open-hearth or Bessemer	$26.00

Skelp

F.o.b. Pittsburgh, Youngstown, Chicago, Buffalo, Coatesville, Pa., or Sparrows Point, Md.

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Pig Iron, Ores, Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basis	Bessemer
Everett, Mass.	$18.50	$19.00	$18.00	$19.50
Bethelehem, Pa.	18.50	19.00	18.00	19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	....	18.00	....
Neville Island, Pa.	18.00	18.00	17.50	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown	17.50	17.50	17.00	18.00
Buffalo	17.50	18.00	16.50	18.50
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, Ohio	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
Hamilton, Ohio	17.50	17.50	17.00	18.00
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	....
Duluth, Minn.	18.00	18.00	....	18.50
Birmingham	13.50	....	12.50	....
Provo, Utah	16.50	....	....	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basis	Bessemer
Boston Switching District				
From Everett, Mass	$19.00	$19.50	$18.50	$20.00
From Buffalo	19.00	19.50	18.50	20.00
Brooklyn				
From East. Pa. or Buffalo..	20.77	21.27	20.27	21.77
Newark or Jersey City, N. J.				
From East. Pa. or Buffalo...	19.89	20.39	19.39	20.89
Philadelphia				
From Eastern Pa.	19.26	19.76	18.76	20.26
Cincinnati				
From Hamilton, Ohio	18.51	18.51	18.01	19.01..
Canton, Ohio				
From Cleveland and Youngstown	18.76	18.76	....	....
Columbus, Ohio				
From Hamilton, Ohio	19.50	19.50	....	....
Mansfield, Ohio				
From Cleveland and Toledo..	19.26	19.26	....	....
Indianapolis				
From Hamilton, Ohio	19.77	19.77	....	....
South Bend, Ind.				
From Chicago	19.55	19.55	....	....
Milwaukee				
From Chicago	18.50	18.50	....	....
St. Paul				
From Duluth	19.44	....	....	....
Davenport, Iowa				
From Chicago	19.26	19.26	....	....
Kansas City				
From Granite City	20.04	20.54	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N.Y.....$23.00
Johnson City, Tenn. 23.00
Del'd Chicago 28.65

GRAY FORGE PIG IRON

Valley furnace.....$17.50

CHARCOAL PIG IRON

Lake Superior furnace.....$20.50
Delivered Chicago 23.54
Delivered Buffalo 23.78

CANADA

Pig Iron

Per gross ton:

	Delivered Toronto
No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00

	Delivered Montreal
No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard, (carload)	$85.00
Domestic, 80%, seaboard, (ton lots)	92.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$27.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid)..	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$22.25	12%	$29.25
7%	23.25	13%	30.75
8%	24.25	14%	32.25
9%	25.25	15%	33.75
10%	26.25	16%	35.25
11%	27.75	17%	36.75

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$27.25	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads .....$1.25 to $1.25
Ferrotungsten, less carloads 1.30 to 1.35
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads ..... 10.00c.
Ferrochromium, 2% carbon .....16.50c. to 17.00c.
Ferrochromium, 1% carbon .....17.50c. to 18.00c.
Ferrochromium, 0.10% carbon .....19.50c. to 20.00c.
Ferrochromium, 0.06% carbon .....20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V.....$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace, carload and contract per net ton.$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage.... 50.00
Ferrophosphorous, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage..... 65.00
Ferromolybdenum, per lb. Mo., del. 95c.
Calcium molybdate, per lb. Mo., del. ..... 80c.
Silico spiegel, per ton, f.o.b. furnace, car lots $38.00
Ton lots or less, per ton..... 45.50
Silico-manganese, gross ton, delivered:
2.50% carbon grade..... .. 90.00
2% carbon grade 95.00
1% carbon grade 105.00
Spot prices .....$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron.....	4.65
Mesabi, non-Bessemer, 51.50% iron..	4.50
High phosphorous, 51.50% iron....	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	22c.
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½..	20c.

	Per Net Ton Unit
Tungsten, Chinese wolframite ,duty paid*	$15.00
Tungsten, domestic scheelite	$14.50 to $15.00

	Per Gross Ton
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines.....	$15.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines.....	16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid.....	18.50
Domestic, No. 1 ground bulk, 85 to 88% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$13.25 to $13.75
No. 2 heavy melting steel	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
Scrap rails	13.50 to 14.00
Rails 3 ft. and under	14.50 to 15.00
Sheet bar crops, ordinary	14.00 to 14.50
Compressed sheet steel	13.25 to 13.75
Hand bundled sheet steel	12.00 to 12.50
Hvy. steel axle turnings	10.50 to 11.00
Machine shop turnings	8.75 to 9.25
Short shov. steel turnings	8.75 to 9.25
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Cast iron carwheels	11.00 to 11.50
Heavy breakable cast	11.25 to 11.75
No. 1 cast	11.50 to 12.00
Railr. knuckles and couplers	15.00 to 15.50
Rail, coil and leaf springs	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Low phos. billet crops	16.00 to 16.50
Low phos. sheet bar crops	15.00 to 15.50
Low phos. plate scrap	14.50 to 15.00
Low phos. punchings	15.00 to 15.50
Steel car axles	14.50 to 15.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$10.50 to $11.00
Shoveling steel	10.50 to 11.00
Hydraulic comp. sheets	$9.25 to $9.75
Drop forge flashings	8.50 to 9.00
No. 1 busheling	9.00 to 9.50
Rolled carwheels	11.50 to 12.00
Railroad tires	11.50 to 12.00
Railroad leaf springs	11.00 to 11.50
Axle turnings	8.50 to 9.00
Steel couplers and knuckles	11.50 to 12.00
Coil springs	12.00 to 12.50
Axle turnings (elec. fur.)	9.25 to 9.75
Low phos. punchings	12.50 to 13.00
Low phos. plates, 12 in. and under	12.50 to 13.00
Cast iron borings	6.50 to 7.00
Short shoveling turnings	6.25 to 6.75
Machine shop turnings	6.00 to 6.50
Rerolling rails	11.50 to 12.00
Steel rails, less than 3 ft.	12.00 to 12.50
Steel rails, less than 2 ft.	12.50 to 13.00
Angle bars, steel	11.50 to 12.00
Cast iron carwheels	11.00 to 11.50
Railroad malleable	11.00 to 11.50
Agricultural malleable	9.00 to 9.50

	Per Net Ton
Iron car axles	$12.00 to $12.50
Steel car axles	11.50 to 12.00
No. 1 railroad wrought	9.25 to 9.75
No. 2 railroad wrought	9.25 to 9.75

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$36.00
Cleveland	36.00
Chicago	37.00
Birmingham	39.00
Youngstown (del'd)	37.00

ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b. Pittsburgh, Chicago, Buffalo, Massillon, Canton or Bethlehem.

Base price, $49 a gross ton except at Bethlehem, where it is $51.

CARBON STEEL FORGING INGOTS

F.o.b. Pittsburgh, Youngstown or Chicago.

Uncropped, $28 per gross ton.

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.50
Foundry, f.o.b. Connellsville Prompt	$4.25 to 5.25
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	10.50
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland delivered	9.27
Foundry, Birmingham	4.75
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.55 to $1.80
Mine run coking coal f.o.b. W. Pa.	1.80 to 2.00
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.30
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.20
Steam slack, f.o.b. W. Pa. mines	1.30 to 1.40
Gas slack, f.o.b. W. Pa. mines	1.65 to 1.85

Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

	Per Gal f.o.b. Baltimore
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

	Per Gal. del'd Chicago
No. 3 industrial fuel oil	3.73c.
No. 5 industrial fuel oil	3.00c.

	Per Gal f.o.b. Cleveland
No. 3 distillate	5.75c.
No. 4 industrial	5.50c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	43.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Chrome Brick

	Per Net Ton
Standard size	$45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	55.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$44.00 to $45.00
4-in., del'd Chicago	47.00 to 48.00
6-in. and larger, del'd New York	43.00
4-in., del'd New York	46.00
6-in., and larger, Birmingham,	36.00 to 37.00
4-in. Birmingham	39.00 to 40.00

Class "A" and gas pipe, $3 extra.

No. 2 busheling	$4.00 to	$4.50
Locomotive tires, smooth	9.00 to	9.50
Pipe and flues	5.25 to	5.75
No. 1 machinery cast	9.50 to	10.00
Clean automobile cast	9.00 to	9.50
No. 1 railroad cast	9.00 to	9.50
No. 1 agricultural cast	8.00 to	8.50
Stove plate	7.50 to	8.00
Grate bars	6.50 to	7.00
Brake shoes	8.50 to	9.00

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$11.50 to	$12.00
No. 2 heavy melting steel	....	9.50
No. 1 railroad wrought	....	11.00
Bundled sheets	....	9.50
Hydraulic compressed, new	9.50 to	10.00
Hydraulic compressed, old	7.00 to	7.50
Machine shop turnings	....	7.50
Heavy axle turnings	10.00 to	10.50
Cast borings	5.50 to	6.00
Heavy breakable cast	11.50 to	12.00
Stove plate (steel works)	....	9.50
No. 1 low phos. heavy	14.50 to	15.00
Couplers and knuckles	14.00 to	14.50
Rolled steel wheels	14.00 to	14.50
No. 1 blast furnace	5.50 to	6.00
Spec. iron and steel pipe	10.00 to	10.50
Shafting	....	16.50
Steel axles	....	14.50
No. 1 forge fire	11.00 to	11.50
Cast iron car wheels	12.50 to	13.00
No. 1 cast	12.00 to	13.00
Cast borings (chem.)	12.00 to	14.00
Steel rails for rolling	....	13.00

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.00 to	$10.50
No. 2 heavy melting steel	9.00 to	9.50
Compressed sheet steel	9.50 to	10.00
Light bundled sheet stampings	6.50 to	7.00
Drop forge flashings	9.00 to	9.50
Machine shop turnings	8.00 to	8.50
Short shoveling turnings	8.00 to	8.50
No. 1 busheling	9.50 to	10.00
Steel axle turnings	8.50 to	9.00
Low phos. billet crops	12.50 to	13.00
Cast iron borings	8.00 to	8.50
Mixed borings and short turnings	8.00 to	8.50
No. 2 busheling	8.00 to	8.50
No. 1 cast	10.50 to	11.00
Railroad grate bars	6.50 to	7.00
Stove plate	7.50 to	8.00
Rails under 3 ft.	14.00 to	14.50
Rails for rolling	10.50 to	11.00
Railroad malleable	11.75 to	12.00
Cast iron carwheels	....	11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	....	$11.00
No. 2 heavy melting scrap	$9.50 to	10.00
Scrap rails	10.50 to	11.00
New hydraul. comp. sheets	9.50 to	10.00
Old hydraul. comp. sheets	6.50 to	7.00
Drop forge flashings	9.50 to	10.00
No. 1 busheling	9.50 to	10.00
Hvy. steel axle turnings	8.50 to	9.00
Machine shop turnings	7.00 to	7.50
Knuckles and couplers	12.00 to	12.50
Coil and leaf springs	12.00 to	12.50
Rolled steel wheels	12.00 to	12.50
Low phos. billet crops	13.50 to	14.00
Short shov. steel turnings	7.50 to	8.00
Short mixed borings and turnings	7.50 to	8.00
Cast iron borings	7.00 to	7.50
No. 2 busheling	6.50 to	7.00
Steel car axles	12.00 to	12.50
Iron axles	11.00 to	12.00
No. 1 machinery cast	12.00 to	12.50
No. 1 cupola cast	10.50 to	11.00
Stove plate	9.25 to	9.75
Steel rails, 3 ft. and under	12.00 to	12.50
Cast iron carwheels	11.00 to	11.50
Industrial malleable	11.50 to	12.00
Railroad malleable	11.50 to	12.00
Chemical borings	9.00 to	10.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	....	$10.00
Scrap steel rails	....	9.00
Short shoveling turnings	....	5.50
Stove plate	$7.00 to	7.50
Steel axles	11.00 to	11.50
Iron axles	11.00 to	11.50
No. 1 railroad wrought	....	7.00
Rails for rolling	....	10.50
No. 1 cast	9.00 to	9.50
Tramcar wheels	9.00 to	9.50
Cast iron borings, chem	....	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$10.00 to	$10.50
No. 1 heavy melting	9.00 to	9.50
No. 2 heavy melting	8.50 to	9.00
No. 1 locomotive tires	8.00 to	8.50
Misc. stand.-sec. rails	10.50 to	11.00
Railroad springs	11.50 to	12.00
Bundled sheets	6.00 to	6.50
No. 2 railroad wrought	9.00 to	9.50
No. 1 busheling	6.50 to	7.00
Cast iron borings and shoveling turnings	4.50 to	5.00
Rails for rolling	11.00 to	11.50
Machine shop turnings	4.25 to	4.75
Heavy turnings	5.50 to	6.00
Steel car axles	10.75 to	11.25
Iron car axles	12.50 to	13.00
Wrot iron bars and trans.	9.75 to	10.25
No. 1 railroad wrought	6.25 to	6.75
Steel rails less than 3 ft.	12.00 to	12.50
Steel angle bars	11.50 to	12.00
Cast iron carwheels	8.25 to	8.75
No. 1 machinery cast	8.50 to	9.00
Railroad malleable	8.75 to	9.25
No. 1 railroad cast	8.00 to	8.50
Stove plate	6.50 to	7.00
Relay rails, 60 lb. and under	16.00 to	16.50
Relay, rails, 60 lb. and over	$20.00 to	$21.00
Agricult. malleable	9.00 to	9.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$6.75 to	$7.25
Scrap T rails	6.75 to	7.25
Machine shop turnings	3.00 to	3.25
Cast iron borings	4.00 to	4.25
Bundled skeleton, long	4.75 to	5.25
Forge flashings	5.00 to	5.50
Blast furnace scrap	2.75 to	3.00
Shafting	10.25 to	10.50
Steel car axles	9.75 to	10.25
Wrought pipe	4.50 to	4.75
Rails for rerolling*	14.00 to	14.50
Cast iron borings, chemical	9.00 to	9.50
Per gross ton delivered consumers' yards:		
Textile cast	$10.00 to	$10.50
No. 1 machinery cast	10.00 to	10.50
Stove plate	4.50 to	4.75
Railroad malleable	11.00 to	11.50

*Delivered Eastern Pennsylvania points.

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$7.50 to	$9.00
No. 2 heavy melting steel	6.00 to	7.50
Heavy breakable cast	7.50 to	8.00
No. 1 machinery cast	8.00 to	8.50
No. 2 cast	6.50 to	7.00
Stove plate	5.00 to	5.50
Steel car axles	10.50 to	10.75
No. 1 railroad wrought	7.50 to	8.00
No. 1 yard wrought, long	$6.50 to	$7.00
Spec. iron and steel pipe	5.75 to	6.00
Forge fire	5.50 to	6.00
Rails for rerolling	8.00 to	8.50
Short shoveling turnings	3.00 to	3.50
Machine shop turnings	3.50 to	3.75
Cast borings	4.50 to	4.75
No. 1 blast furnace	2.50 to	3.00
Cast borings (chemical)	11.00 to	11.50
Unprepared yard iron and steel	4.50 to	5.00
Per gross ton, delivered local foundries:		
No. 1 machinery cast		$11.00
No. 1 hvy. cast (cupola size)		10.00
No. 2 cast		9.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$8.25 to	$9.00
Scrap rails for melting	9.00 to	9.50
Loose sheet clippings	4.75 to	5.25
Bundled sheets	6.00 to	6.50
Cast iron borings	6.00 to	6.50
Machine shop turnings	5.50 to	6.00
No. 1 busheling	6.50 to	7.00
No. 2 busheling	3.50 to	4.00
Rails for rolling	9.50 to	10.00
No. 1 locomotive tires	9.00 to	9.50
Short rails	11.75 to	12.25
Cast iron carwheels	8.25 to	8.75
No. 1 machinery cast	9.50 to	10.00
No. 1 railroad cast	9.00 to	9.50
Burnt cast	6.50 to	7.00
Stove plate	6.50 to	7.00
Agricultural malleable	8.50 to	9.00
Railroad malleable	9.00 to	9.50

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$8.50 to	$9.00
Borings and short turnings	6.50 to	7.00
Long turnings	5.50 to	6.00
No. 1 machinery cast	9.00 to	9.50
Automotive cast	10.25 to	10.75
Hydraul. comp. sheets	8.75 to	9.25
Stove plate	6.50 to	7.00
New factory busheling	7.00 to	7.50
Old No. 2 busheling	5.00 to	5.50
Sheet clippings	6.00 to	6.50
Flashings	7.25 to	7.75
Low phos. plate scrap	9.75 to	10.25

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$5.50	$5.50
Rails, scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	3.50
Steel axles	4.50	6.00
Axles, wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.05c.
Structural shapes	3.05c.
Soft steel bars and small shapes	2.85c.
Reinforcing steel bars	3.00c.
Cold-finished and screw stock—	
Rounds and hexagons	3.20c.
Squares and flats	3.20c.
Hoops and bands, under ¼ in.	3.10c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.15c.
Galv. sheets (No. 24), 25 or more bundles	3.70c.
Hot-rolled sheets (No. 10)	2.85c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.32
Spikes, large	2.90c.
Small	2.65c.
Bolts	2.90c.
Track bolts, all sizes, per 100 count,	65 per cent off list.
Machine bolts, 100 count,	65 per cent off list.
Carriage bolts, 100 count,	65 per cent off list.
Nuts, all styles, 100 count,	65 per cent off list.
Large rivets, base per 100 lb.	$3.25
Wire, black, soft ann'l'd, base per 100 lb.	2.90
Wire, galv. soft, base per 100 lb.	3.35
Common wire nails, per keg	2.65
Cement coated nails, per keg	2.65

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	2.90c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.40c.
Flats and squares	3.40c.
Bands, 3/16 in. (in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.20c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.30c.
Hot-rolled sheets (No. 10)	2.85c.
Spikes (9/16 in. and lighter)	3.50c.
Track bolts	4.65c.
Rivets, structural (keg lots)	3c.
Rivets, boiler (keg lots)	3.10c.
	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq., tap. or blank	60 and 5
Hot-pressed nuts, hex., tap. or blank	60 and 5
Hex. head and cap screws	80
Cup point set screws	70
Flat head bright wood screws	37½ and 10
Spring cotters	50
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$5.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.75
Com. wire nails, base per keg	2.70c.
Cement c't'd nails, base per keg	2.70c.

NEW YORK

	Base per Lb.
Plates	3.30c.
Structural shapes	3.27c.
Soft steel bars, small shapes	3.17c.
Iron bars	3.24c.
Iron bars, swed. charcoal	6.50 to 7.00c.
Cold-fin. shafting and screw stock;	
Rounds and hexagons	3.92c.
Flats and squares	4.42c.
Cold-roll. strip, soft and quarter hard	4.00c.
Hoops	3.42c.
Bands	3.42c.
Hot-rolled sheets (No. 10)	3.17c.
Hot-rolled ann'l'd sheets (No. 24*)	3.65c.
Galvanized sheets (No. 24*)	4.25c.
Long terne sheets (No. 24)	4.75c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.30c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel ⅛ x ⅓ in. and larger	3.40c.
Smooth finish. 1 to 2½ x ¼ in. and larger	3.75c.
Open hearth spring steel, bases	3.75c. to 10.00c.
Common wire nails, base, per keg	$3.00
	Per Cent Off List
Machine bolt, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	60
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST LOUIS

	Base per Lb.
Plates and struc. shapes	3.34c.
Bars, soft steel or iron	3.14c.
Cold-fin. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Galv. sheets (No. 24)	4.54c.
Hot-rolled sheets (No. 10)	3.19c.
*Black corrug. sheets (No. 24)	3.99c.
Galv. corrug. sheets	4.59c.
Structural rivets	3.59c.
Boiler rivets	3.69c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	60
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	
1000 lb. or over	60
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.75c.
*Structural shapes	2.75c.
*Soft steel bars, small shapes, iron bars (except bands)	2.75c.
‡Reinforc. steel bars, sq. twisted and deformed	2.505c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.30c.
*Steel bands, No. 12 to 3/16 in., incl.	3.05c.
Spring steel	5.00c.
†Hot-rolled annealed sheets (No. 24)	3.40c.
†Galvanized sheets (No. 24)	4.00c.
*Hot-rolled annealed sheets (No. 10)	2.95c.
Diam. pat. floor plates, ¼ in.	4.75c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For 5 tons or more, exclusive of cutting charge.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.21c.
Soft steel bars	2.90c.
Reinforc. steel bars	2.00c. to 2.50c.
Cold-finished steel bars	3.40c.
Flat rolled steel under ¼ in.	3.26c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.76c.
Galvanized sheets (No. 24)	4.36c.
Hot-rolled sheets (No. 10)	3.01c.
Black ann'l'd wire, per 100 lb.	$2.45
No. 9 galv. wire, per 100 lb.	2.80
Com. wire nails, base per keg	2.45

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.30c.
Bars, soft steel or iron	3.10c.
New billet reinforc. bars	3.10c.
Rail steel reinforc. bars	3.10c.
Hoops and bands, 3/16 in. and lighter	3.35c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.45c.
Hot-rolled sheets (No. 10)	3.10c.
Structural rivets	4.00c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, 1-in., per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.69
4-in.	41.23
Lap-welded steel boiler tubes, 2-in.	16.43
4-in.	38.31

BUFFALO

	Base per Lb.
Plates	3.27c.
Struc. shapes	3.15c.
Soft steel bars	2.95c.
Reinforcing bars	1.95c.
Cold-fin. flats and sq.	3.35c.
Rounds and hex.	3.25c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Galv. sheets (No. 24)	4.15c.
Bands	3.32c.
Hoops	3.32c.
Hot-rolled unannealed sheets	3.07c.
Com. wire nails, base per keg	$3.00
Black wire, base per 100 lb.	3.25

BOSTON

	Per Lb.
Beams, channels, angles, tees, zees	3.42c.
H beams and shapes	3.42c.
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.43c.
Floor plates, diamond pattern	5.18c.
Bar and bar shapes (mild steel)	3.25c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.50c. to 4.50c.
Half rounds, half ovals, ovals and bevels	4.50c.
Tire steel	4.50c.
Cold-finished rounds and hexagons	3.70c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.20c.
Blue annealed sheets, No. 10 ga.	3.25c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Galvanized steel sheets, No. 24 ga.	4.60c.
Lead coated sheets, No. 24 ga.	5.65c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U.M.	3.50c.	3.40c.	3.40c.
Shapes, standard	3.50c.	3.40c.	3.40c.
Wide-flanged beams and columns	3.70c.	3.60c.	3.60c.
Soft steel bars	3.55c.	3.40c.	3.40c.
Reinforcing bars	3.10c.	3.15c.	3.50c.
Hot-rolled annealed sheets (No. 24)	4.25c.	4.15c.	4.25c.
Hot-rolled sheets (No. 10)	3.75c.	3.65c.	3.65c.
Galv. sheets (No. 24)	4.85c.	4.75c.	4.85c.
Struc. rivets, ⅞ in. and larger			
less than 100 lb.	6.25c.	6.00c.	5.00c.
Cold finished steel			
Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg			
less carload	$3.35	$3.25	$3.45

All items subject to differentials for quantity.

Pipe Lines

Colton, Cal., takes bids soon for 47,635 ft. of 6 to 10-in. steel pipe for new water supply system. Fund of $93,000 has been arranged through Federal aid, including new booster pumping station and 3,000,000-gal. reservoir. Currie Engineering Co., Anderson Building, San Bernardino, Cal., is engineer.

Plant City, Fla., plans about 5000 ft. of 4-in., and 80,000 ft. of 2-in. for gas pipe line system. Financing for $110,000 is being arranged for this and municipal artificial gas station.

Boulder, Colo., plans about three miles of 16-in. steel pipe, cement-lined, for water supply, replacing present pipe line. Financing has been arranged.

W. A. Bechtel Co., 155 Sansome Street, San Francisco, has secured contract from San Francisco Public Utilities Commission for 44-in. welded steel pipe line from Calaveras Dam, near Sunol, to Alameda Creek Siphon, Hetch Hetchy Aqueduct, about 30,000 ft., at $223,623.

Whatcom Natural Gas Co., Bellingham, Wash., H. O. Griffin, 170 South Garden Street, vice-president, plans natural gas steel pipe line from point near Ferndale to Bellingham and vicinity.

Ozark, Ala., plans steel pipe line for gas distribution. Financing for $50,000 is being arranged through Federal aid, including gas plant.

Island Gas Corpn., Ashland, Ky., plans 4-in. steel pipe gas line over fork of Big Sandy River, Floyd County, Ky.

Milwaukee Sewage Commission is in the market for 200 tons of stainless steel clad pipe for a main air header.

Colton, Cal., will take bids Feb. 5 on 47,980 ft. of 6 to 12-in. steel pipe for improvements to city water system.

Los Angeles is considering the purchase of 290 tons of 22-in. pipe for Metropolitan Water District.

Railroad Equipment

Lehigh Valley has received an additional $500,000 from P.W.A. for the purchase of five locomotives.

Midland Continental has been awarded $40,000 by P.W.A. to purchase one Diesel locomotive.

New York, New Haven & Hartford has received an additional allotment of $2,000,000 from P.W.A. for the purchase of 50 passenger cars. Bids for the cars and for a streamline train are being received by the company.

Erie Railroad has asked for bids on 125 passenger cars and eight all-steel mail cars, as well as 3175 freight cars. (Details elsewhere in this issue.)

Boston & Maine has applied for Government funds to buy 10 all-steel passenger coaches and to repair and air-condition equipment.

RAILS

Boston & Maine has applied to the ICC for authority to borrow from the PWA for funds to purchase 30,000 tons of 131-lb. and 112-lb. rails.

New York, New Haven & Hartford contemplates purchasing 25,000 tons of rails and 10,000 tons of track supplies.

Cast Iron Pipe

United States Pipe & Foundry Co. was awarded 130 tons of 12-in. and smaller for installation at the State Hospital, Woodbourne, N. Y.

Providence, R. I., has awarded a year's contract for special castings to Builders Iron Foundry.

Great Barrington, Mass., will close bids Feb. 1 on about 360 tons.

Sudbury, Mass., has asked tenders on about one mile of pipe.

Cambridge, Mass., will close bids Jan. 29 on 100 tons.

New Bedford, Mass., plans about four miles of 48-in. to replace present 36-in. line. Federal financing for $500,000 has been arranged for this and other water system extensions.

Chicago is in the market for eight 48-in. electrically operated gate valves for pumping stations.

Wilmette, Ill., opened bids Jan. 23 on 900 tons of 24-in.

McArthur, Ohio, plans about five miles of 4 to 8-in. for water supply system; also 150,000-gal. steel tank on 100-ft. tower, and pumping plant. Fund of $60,000 has been arranged through Federal aid. Burgess & Niple, 568 East Broad Street, Columbus, Ohio, are engineers.

Buford, Ga., plans about two and one-half miles of 10-in. for water supply system. Fund of $30,000 is being arranged. Robert & Co., Bona Allen Building, Atlanta, Ga., are engineers.

Madison, Fla., plans about 7200 ft. of 6 and 10-in. for new water supply system. Fund of $50,000 is being arranged, including 200,000-gal. elevated steel storage tank and tower, and deep-well pumping station.

Del Rio, Tex., plans water pipe line to San Felipe, Tex., replacing present wood pipe system. Fund of $77,000 has been secured through Federal aid.

Shawnee Township, Wyandotte County, Kan., T. C. Maddox, 2216 South Twenty-sixth Street, Kansas City, Kan., chairman, plans water pipe line to Kanview, Crestline Gardens and Rosedale districts. Financing for $150,000 is being arranged through Federal aid.

Morgan Hill, Cal., plans about 34,000 ft. of different size pipe for extensions in water supply system. Fund of $45,000 has been arranged for this, and 150,000-gal. reservoir and pumping station. C. C. Kennedy, Call Building, San Francisco, is engineer.

Tumwater, Wash., has awarded 100 tons of 6 and 8-in. to American Cast Iron Pipe Co.

Los Angeles has awarded 200 tons of 2-in. to Pacific States Cast Iron Pipe Co.

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Turned and Polished Shafting — Turned and Ground Shafting

Fabricated Structural Steel

Awards in Larger Volume—New Projects Lower

LETTINGS of 11,550 tons were mostly in small tonnages and compare with 9850 tons last week. The largest booking was 2400 tons for the Bonnet Carre bridge in Louisiana for the Louisiana & Arkansas Railway. Other awards included 1200 tons for a dam across the Mississippi River at Dubuque, Iowa, and 1050 tons for a State hospital building at Manteno, Ill. New projects of 5450 tons compare with 14,250 tons in the previous week and 5800 tons two weeks ago. No new job of size is reported. Inquiries range from 100 tons to 750 tons. Fabricated plate inquiries total 5000 tons, including 4000 tons for a dredge and pontoons on which bids will open Feb. 2. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Moosehead Station, Me., 150 tons, highway bridge, to New England Structural Steel Co.

Auburn, Mass., 250 tons, State bridge over New Haven Railroad to McClintic-Marshall Corpn.

Boston, 125 tons, Central Wharf shed, to New England Structural Co.

Sagamore, Mass., 165 tons, coffer dam framing for Cape Cod highway bridges, to American Bridge Co.

Ticonderoga, N. Y., 140 tons, artillery armory, to Belmont Iron Works.

Hasbrouck Heights, N. J., 115 tons, highway bridge, to American Bridge Co.

Fossilville, Pa., 170 tons, State highway bridge, to McClintic-Marshall Corpn.

Potter County, Pa., 135 tons, highway bridge, to Fort Pitt Bridge Works Co.

Baltimore, 425 tons, State tobacco warehouse, to Bethlehem Fabricators, Inc.

Washington, 275 tons, towers for Department of Agriculture, to Aermotor Co., Chicago.

SOUTH AND SOUTHWEST

Fort Knox, Ky., 330 tons, cavalry buildings, to Bedford Foundry & Machine Co.

Big Clifty, Ky., 900 tons, viaduct for Illinois Central Railroad, to McClintic-Marshall Corpn.

Coal Creek, Tenn., 425 tons, cable towers, to Virginia Bridge & Iron Co.

Cobb County, Ga., 220 tons, highway bridge, to American Bridge Co.

Bonnet Carre, La., 2400 tons, bridge for Louisiana & Arkansas Railway, to McClintic-Marshall Corpn.

Latimer County, Okla., 170 tons, highway bridge, to Illinois Steel Bridge Co.

Pushmataha County, Okla., 270 tons, highway bridge, to Muskogee Iron Works.

CENTRAL STATES

Ludington, Mich., 110 tons, highway bridge, to R. C. Mahon Co.

State of Wisconsin, 350 tons, subways, to Milwaukee Bridge Co.

Sioux County, Iowa, 150 tons, beam spans, to Des Moines Steel Co.

Iowa City, Iowa, 225 tons, Fine Arts building, to A. C. Wood & Co., Rockford, Ill.

Dubuque, Iowa, 1200 tons, dam across Mississippi River, to Lakeside Bridge & Steel Co.

State of Iowa, 245 tons, bridges, to Clinton Bridge Co.

Chicago, 100 tons, alterations, to Marshall Field & Co.'s store, to Gage Structural Steel Co.

Manteno, Ill., 1050 tons, State hospital buildings, to Duffin Iron Works.

Selkirk, Kan., 210 tons, bridge for Missouri Pacific Railroad, to Virginia Bridge & Iron Co.

WESTERN STATES

San Francisco, 100 tons, caissons work on Trans-Bay bridge, to Moore Dry Dock Co.

State of California, 555 tons, two bridges over Eel River, to McClintic-Marshall Corpn.

Santa Rosa, Cal., 380 tons, County bridge over Russian River, material purchased in open market.

State of California, 180 tons, highway structures in four counties, to unnamed bidders.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Long Island, N. Y., 290 tons, bridge for Long Island Railroad.

Comstock, N. Y., 310 tons, State prison shop building.

Washington, 200 tons, boiler supports for Navy Department.

THE SOUTH

Frankfort, Ky., 175 tons, addition to a distillery.

Norfolk, Va., 850 tons, approaches to Campostella bridge; new bids being taken.

Buchanan, Va., 330 tons, State highway bridge.

Fort Benning, Ga., 450 tons, bridge for United States Government.

Wilcox, Fla., 310 tons, State highway bridge.

State of Mississippi, 400 tons, highway bridges.

CENTRAL STATES

Shelby, Ohio, 100 tons, addition to municipal lighting plant.

Dayton, Ohio, 290 tons, static test shop for Wright Field, bids Jan. 25.

Gogebic, Mich., 130 tons, State highway bridge; Wickes Engineering & Construction Co., Des Moines, low bidder.

Cincinnati, 225 tons, addition to Jergens factory.

State of Illinois, 400 tons, five bridges.

Davies County, Mo., 175 tons, highway bridge.

St. Louis, 100 tons, addition to Falstaff Brewery.

State of Nebraska, 750 tons, five bridges.

State of Nebraska, 380 tons, highway bridges at Angus and Benson.

WESTERN STATES

State of Montana, 190 tons, bridges in four counties; bids Jan. 27.

Seattle, 3615 tons sheet piling, material only for Railway Avenue seawall; bids soon.

Los Angeles, 350 tons, current deflectors.

FABRICATED PLATE

AWARDS

Norfolk, Mass., 100 tons, water tank, to Pittsburgh-Des Moines Steel Co.

Lexington, Mass., 150 tons, water tank, to McClintic-Marshall Corpn.

Wellsville, N. Y., 130 tons, Sinclair Refining Co. storage tanks, to Chicago Bridge & Iron Works.

NEW PROJECTS

Kaukauna, Wis., unstated tonnage, 500,000-gal. elevated water tank for city, Pittsburgh-Des Moines Steel Co., low bidder.

Kansas City, Mo., 4000 tons, dredge boats and pontoons; bids to be opened by United States Engineer Feb. 2.

Denver, 900 tons, Owyhee River project syphons, Chicago Bridge & Iron Co., low bidder.

Mare Island, 100 tons, two boilers at Navy Yard, Alta Electric & Mechanical Co., low bidder.

Reinforcing Steel

Awards 6650 Tons—New Projects 2450 Tons

AWARDS

Rockland County, N. Y., 400 tons, State Hospital buildings, to Carroll-McCreary & Co., Inc.

Sullivan County, N. Y., 125 tons, highway bridge, to Kalman Steel Corpn.

Atlantic City, N. J., 100 tons, culverts, etc., for Pennsylvania-Reading seashore line, to Kalman Steel Corpn.

Pittsburgh, 190 tons, Chrysler sales and service building, to Truscon Steel Co.

Bonnet Carre, La., 3600 tons, bridge, to Laclede Steel Co.

Lake Charles, La., 1800 tons, alkali works, to National Steel Co. and Laclede Steel Co.

State of Illinois, 250 tons, road work, to Calumet Steel Co.

Long Beach, Cal., 150 tons, reinforcing walls of City Hall, to Graham Brothers.

State of California, 130 tons, highway work in seven counties, to unnamed bidders.

NEW REINFORCING BAR PROJECTS

Patterson Field, Ohio, 100 tons, miscellaneous buildings.

Los Angeles County, Cal., 135 tons, State paving between State and Mission Road; bids Feb. 2.

Bakersfield, Cal., 300 tons, Kern County Union High School addition; bids under advisement.

Seattle, 1755 tons, material only for Railway Avenue seawall; bids soon.

Colton, Cal., 145 tons, city reservoir, bids Feb. 5.

Ohio River Steel Shipments Lower

SHIPMENTS of iron and steel products on the Ohio River in the Pittsburgh district in December aggregated 36,038 net tons, compared with 39,573 tons in November, 49,047 tons in October and 30,048 tons in December, 1932, according to the latest report of the United States Engineer Office, Pittsburgh. Total movements of steel products on the Monongahela River in December were 38,693 tons, compared with 28,216 tons in November, and 28,169 tons in December, 1932. Shipments of iron and steel on the Allegheny River last month totaled 4130 tons.

Stainless Steel Prices Reduced

LOWER prices have been filed with the American Iron and Steel Institute on various forms of stainless steel. In the 18-and-8 classification hot-rolled strip has been reduced 3½c. a lb. to 20c. a lb., Pittsburgh, and cold-rolled strip has been marked down 3c. a lb. to 27c. a lb. In the 16-and-6 classification there have been similar reductions to 17c. for hot-rolled strip and 24c. for cold-rolled. Stainless steel with 10 to 15 per cent chromium has been reduced 2c. to 15c. a lb. in hot-rolled strip and to 20½c. a lb. in cold-rolled strip. There has also been a downward revision in 15 to 18 per cent chromium steel strips, hot-rolled being reduced 2½c. to 16c. and cold-rolled 2c. to 22c. a lb.

The New Prices

	Base Price Per Pound
Carbon 0.08 to 0.12 per cent Chromium 18 per cent Nickel 8 per cent	
Rerolling slabs and billets	15c.
Hot-rolled strip	20c.
Cold-rolled strip	27c.
* * *	
Carbon 0.15 per cent minimum Chromium 16 per cent maximum Nickel 6 per cent maximum	
Cold-rolled strip	24c.
Hot-rolled strip	17c.
Rerolling billets	12c.
* * *	
Carbon 0.12 per cent maximum Chromium 10 to 15 per cent	
Rerolling slabs and billets	10½c.
Hot-rolled strip	15c.
Cold-rolled strip	20½c.
* * *	
Carbon 0.12 per cent maximum Chromium 15 to 18 per cent	
Rerolling slabs and billets	11¼c.
Hot-rolled strip	16c.
Cold-rolled strip	22c.

G. E. to Get Medal For Industrial Research

"FOR pioneering in industrial research," the General Electric Co. will be presented on Thursday, Feb. 1, with a gold medal by the American Institute of the City of New York.

The exercises will take place at the Museum of Natural History in New York, where a dinner will be served, followed by the presentation speech by the president of the American Institute, Dr. H. H. Sheldon. The medal will be accepted by Dr. William D. Coolidge, the present director of the General Electric Co.'s, research laboratory. An hour's program of laboratory demonstrations will then be given by scientists of the laboratory staff.

The text of the citation accompanying the medal is as follows: "For pioneering in industrial research . . . for great achievements in pure science that have furnished gainful occupation for thousands of workers and that have raised the standard of living and increased health and happiness, the American Institute of the City of New York awards its gold medal to the General Electric Co."

The American Institute has not made an award of this sort for many years. The General Electric Co. has never before received an award as a corporation, although many of its scientists and engineers have in times past received awards for their individual achievements.

Demand Improves at Cincinnati

CINCINNATI, Jan. 23. — Better foundry operations are reflected in the steady demand for pig iron, which has now reached a weekly average of about 500 tons. Bookings included about 375 tons of Southern iron. A sale of 150 tons of Southern iron to an Indiana melter revealed that Southern quotations are unchanged despite rumors of advances.

Warehouse Business

Jobbers report that business is holding to an unusually high level for January. Current orders are chiefly from industrial sources, although the CWA work is stimulating some demand for construction. Prices are without appreciable change.

Steel

An improvement in automotive demand has more than offset a decline in general sheet specifications, sustaining new business at slightly better than 30 per cent of capacity output. The leading interest reports that rolling schedules are between 30 and 40 per cent of normal operations.

Scrap

Activity is largely speculative. Mills refuse to anticipate future needs and are accepting scrap only on old contracts. Dealers look for better prices and are purchasing for yard stocks and for application on contracts. Strength in other districts is sustaining prices here.

Scrap Stronger At Buffalo

BUFFALO, Jan. 23.—A sale of 1000 tons of No. 1 and No. 2 heavy melting steel at $11 and $9.50, following the 10,000 ton sale previously reported, was made last week. The buyer is now regulating shipments. A few odd cars of railroad knuckles and couplers and other specialties were sold at the quoted prices. A 500-ton lot of new hydraulic bundles was sold at $9.25, Buffalo, for shipment to Youngstown.

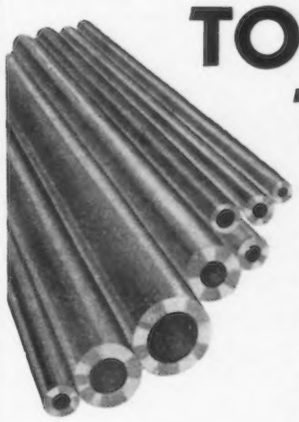
Six open-hearths are active at the Lackawanna plant of the Bethlehem Steel Corpn. Republic Steel Corpn. is operating four and Wickwire-Spencer, one. The Seneca sheet division of Bethlehem is operating at 40 per cent of capacity.

Fabricated structural activity has declined. A local fabricator has the contract for 170 tons for steel canopies for a railroad station in Elmira, N. Y.

Foundries are buying pig iron only in small lots, and apparently to meet immediate needs. Contracting is slow and no sizable inquiries are out. Melt is spotty, but shows signs of improvement. Producers will probably open books for second quarter business about Feb. 20. Furnace operations are unchanged.

NON-SHRINK, OIL HARDENING

TOOL STEEL TUBING



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PLANT EXPANSION AND EQUIPMENT BUYING

Machine Tool Industry Expects Spring Upturn

INQUIRIES continue to characterize machine tool activity, rather than orders, which at present are scattered and principally for light equipment such as lathes, grinders and drilling machines. However, it is the belief in several quarters that many operators are in earnest as to the intention of retooling and that the present flow of inquiries will materialize in a real spring upturn. A report from Cincinnati indicates that some CWA projects are now contributing to machine tool demand.

The Forestry Experimental Station, Madison, Wis., is expected at a later date to issue a small list of machine tools, supplementing its recent purchase of a quantity of hand tools.

A large Cleveland builder of automatic screw machines reports the fulfillment of a number of deferred individual orders for single machines, both from this country and from England. The products department of this company is swamped with orders, largely for die heads, is working 24 hours a day and reports a shortage of skilled operators.

The Ex-Cell-O-Aircraft and Tool Corpn., Detroit, has received orders for several diamond boring machines from the Soviet Government. It is reported that the Amtorg Trading Corpn. is ready to place large machine tool orders in this country as soon as a satisfactory method is established of financing such purchases. Conferences are now being held in Washington which give promise of reaching an agreement whereby the R.F.C. or some other agency will make it possible for American equipment makers to discount Soviet paper.

◀ NORTH ATLANTIC ▶

Standard Gas & Electric Co., 111 Broadway, New York, has authorized fund of $11,792,200 for new construction, including extensions and improvements in plants and systems at Pittsburgh, Minneapolis, Louisville, Milwaukee, Oklahoma City, San Diego and other points. Of gross amount noted, about $7,783,800 will be expended for electric utilities and $1,575,500 for gas properties.

Alsop Engineering Corpn., 39-43 West Sixtieth Street, New York, manufacturer of mechanical equipment, has leased additional floor in building at location noted for new assembling plant.

Walton East Branch Foundry Corpn., Walton, N. Y., has been organized by Francis S. Clarke, Walton, and Charles L. Walsh, 87 North Tenth Street, Newark, N. J., to manufacture iron and other metal castings.

Brooklyn Bottling & Distributing Co., 186 Joralemon Street, Brooklyn, will ask bids in about 60 days for extensions and improvements in four-story brewery on DeKalb Avenue. Cost over $65,000 with equipment. Koch & Wagner, 32 Court Street, are architects.

Swift & Co., Inc., 32 Tenth Avenue, New York, meat packer, has leased property on Washington Street as site for new storage and distributing plant. Cost over $100,000 with equipment.

Automobile Grinding & Boring Corpn., New York, has been organized by Costas P. Panas, 1929 East Ninth Street, Brooklyn, and Constantin A. Melidoni, 23 West Sixty-second Street, New York, to operate a general machine and repair works.

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until Jan. 30 for 200 acetylene cylinders, each 1060 cu. ft. capacity (Proposal 45302); until Feb. 1, two type 5 x 15 acetylene buoy bodies (Proposal 45326).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 30 for 20 automatic air compressors with tank (Schedule 1593); until Feb. 6, 55 exhaust blowers (Schedule 1590), 7500 steel shears (Schedule 1606) for Brooklyn Navy Yard.

Quartermaster, West Point, N. Y., asks bids until Jan. 29 for valves, brass pipe, cast iron soil pipe and fittings, galvanized pipe fittings, unions, couplings, caps, plugs, washers, brass tubing, faucets, dies, valve boxes, furnaces, boiler couplings, etc. (Circular 84).

Phoenix Novelty Co., 250 South Street, Newark, N. J., manufacturer of coat hangers and other wire goods, has leased floor in local building at 46 Spring Street for new plant and will remove to new location.

Constructing Quartermaster, Fort Monmouth, N. J., has let general contract to Ehret-Day Co., 551 Fifth Avenue, New York, for new utility shops, service and garage unit, at $47,987, exclusive of equipment.

Guss Pollock, Inc., Bridgeton, N. J., has been organized by Guss Pollock, 23 South Pearl Street, and associates, to manufacture iron and steel products.

Blenders Distillers Corpn., Jersey City, N. J., recently organized, has leased about 5000 sq. ft. floor space in plant at Wilkinson and Arlington Avenues, for new blending and rectifying plant.

Center Engineering Co., Inc., Garwood, N. J., has been organized by Adam and Walter Gebaner, 902 Center Street, to manufacture automotive and radio equipment.

Athos Steel Service, Philadelphia, recently organized, has leased one-story building at 4550 Tacony Street, 15,000 sq. ft. floor space, for new storage and distributing works.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 30 for telescope sight mounting brackets, gun sights, bomb release handles, gun charging controls, gun charging handles, etc. (Schedule 1596) for Philadelphia Navy Yard.

Neustadtl Brewing Corpn., Stroudsburg, Pa., with headquarters at 1133 Broadway, New York, Victor Neustadtl, president and treasurer, is arranging for stock issue of $359,325, part of fund to be used for expansion and improvements.

American Endless Belt Mfg. Co., Philadelphia, manufacturer of mechanical belting, has leased two-story building, 38 x 112 ft., at Ontario and Weikel Streets, for new plant.

Atlantic Refining Co., 260 South Broad Streeet, Philadelphia, plans rebuilding part of oil storage and distributing plant recently destroyed by fire. Loss about $100,000 with tanks, pumping machinery, still house equipment, etc.

◀ NEW ENGLAND ▶

School Board, Westport, Conn., Robert W. Fuller, chairman, plans manual training department in new high school. Cost $250,000. Financing is being arranged. Sanford Evans & Associates, Westport, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 2 for motor-driven upsetting and forging machine (Schedule 1582) for Boston Navy Yard; until Feb. 6, two motor-driven hacksaws (Schedule 1598) for Portsmouth, N. H., Navy Yard.

Benrus Watch Co., 200 Hudson Street, New York, manufacturer of watch mechanisms, cases, etc., has leased part of plant of Waterbury Clock Co., Waterbury, Conn., for new plant.

Westfield Mfg. Co., Westfield, Mass., has been organized by Edward H. Broadwell and Norman R. Clark, and associates, capital $500,000, to manufacture bicycles, parts, etc. New organization will take over local company of same name.

School Board, Groverland, Mass., plans manual training department in new two-story and basement high school in Gravel Ridge district. Cost about $200,000. Morse & Dickinson, 25 Washington Square, Haverhill, Mass., are architects.

Executive Department, State Militia, State House, Boston, plans new equipment storage and distributing building, with shop facilities at Arsenal, Framingham, Mass. Federal loan of $114,000 has been arranged for unit.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Feb. 8 for pipe line installations for fuel oil, drain, foam solution, water, steam and drip piping, and extensions and improvements in trestle, Naval Fuel Depot, Melville, R. I. (Specification 7601).

◀ OHIO AND INDIANA ▶

City Council, Sandusky, Ohio, has engaged Froehlich & Emery, Second National Bank Building, Toledo, Ohio, consulting engineers, to draw plans for new municipal electric light and power plant. Financing for $1,400,000 is being arranged through Federal aid.

Master Tool Co., Inc., Cleveland, has been organized by A. R. Abeel and V. E. Hendershot to manufacture tools and mechanical equipment. Company will take over organization of same name at 5605 Herman Avenue.

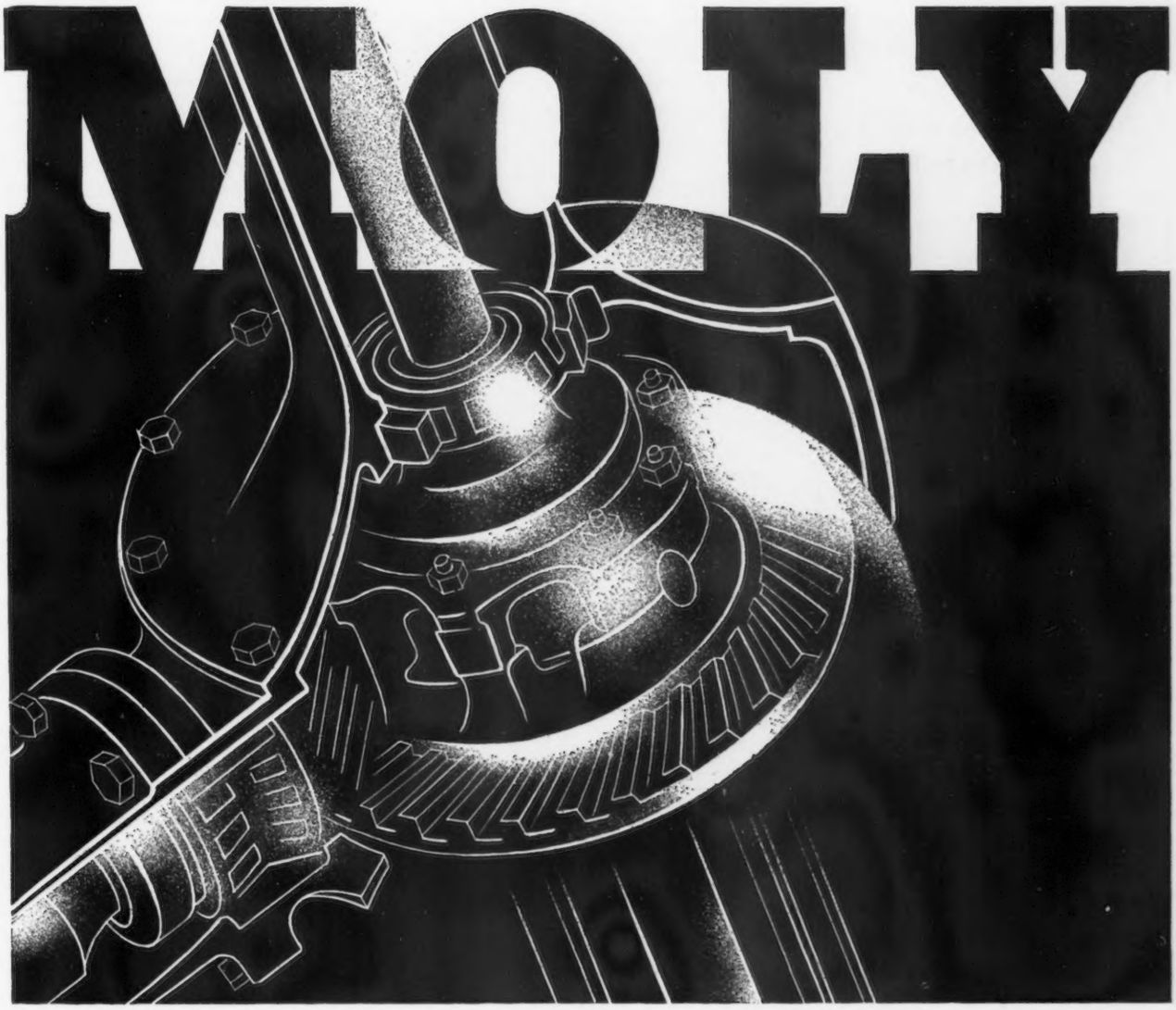
Barnes, Inc., Mansfield, Ohio, recently organized by former officials of Barnes Mfg. Co., with plant for manufacture of hand and power pumps, parts, etc., sanitary enameled products and kindred specialties, in receivership since February, 1933, has purchased plant and business at public sale for upset price of $75,000. New company will place plant in operation at once.

Board of Education, Hillsboro, Ohio, E. E. Holt, superintendent, plans manual training department in new two-story senior and junior high school. Federal loan of $175,000 has been secured. H. R. Ervin, 114 North High Street, is architect; E. C. and G. T. Landberg, 114 Garfield Place, Cincinnati, are associate architects.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until Jan. 30 for 600 wind indicator hood assemblies, 100 runway marker hoods, etc. (Circular 227); until Jan. 31, four electric heat-treating furnaces, muffle type (Circular 228), two gear assemblies (Circular 229).

City Council, Barnesville, Ohio, plans installation of 750,000-gal. capacity elevated steel tank and tower, pipe lines, fittings, etc., for extensions and improvements in municipal water system. Cost $114,000. Federal financing

MOLY



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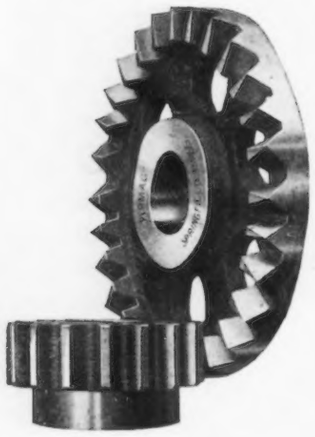

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has been arranged. Jennings & Lawrence, 12 North Third Street, Columbus, Ohio, are engineers.

Quartermaster, Fort Hayes, Columbus, Ohio, asks bids until Feb. 15 for water-softening equipment (Circular 46).

City Council, Tipton, Ind., plans call for bids in about 60 days for new municipal electric light and power plant. Cost $100,000 with equipment. Federal financing has been arranged. Bevington & Williams, Knights of Pythias Building, Indianapolis, are consulting engineers.

American Automotive Corpn., Indianapolis, now being organized with paid-up capital of $500,000, has negotiated for purchase of large part of plant and property of Marmon Motor Car Co., 1101 West Morris Street, in receivership for several months. New company will resume automobile manufacture, concentrating on a 16-cylinder car, similar to former Marmon-Sixteen; expansion will be carried out for production of high-speed marine and aviation engines and parts, as well as automotive equipment for army use. Motor products of Harry A. Miller, Inc., Los Angeles, will be manufactured by new company, including carburetors, pistons and rings, and other engine equipment. Mr. Miller will be an official of new company, as will Preston Tucker, formerly sales manager for Pierce-Arrow Motor Car Co., Buffalo.

WESTERN PENNA.

Standard Steel Car Corpn., Butler, Pa., subsidiary of Pullman Co., Chicago, plans extensions and improvements, including department for manufacture of steel forgings. New machinery will be installed. Cost about $200,000, of which majority will be expended for equipment.

Sam Thompson Corpn., West Brownsville, Pa., recently organized by Samuel J. Thompson and W. A. Griffin, Brownsville, has taken over former West Side Distillery, idle for number of years, and will remodel for distilling plant. New machinery will be installed. Cost over $75,000 with equipment.

Post Office Department, Washington, has secured appropriation of $525,000 for new plant at Reedsville, W. Va., for manufacture of metal furniture, fixtures and other equipment for post offices, including lock boxes. Plans will be drawn at once, and list of equipment arranged.

Frantz Distillery Co., Berlin, Pa., has plans for extensions and improvements, including new rectifying building, bottling works, distillery unit, boiler plant and other structures. Cost over $100,000 with equipment. Paul R. Scheuneman, Magee Building, Pittsburgh, is architect.

BUFFALO DISTRICT

Hammondsport Vintage Corpn., Hammondsport, N. Y., an interest of Distillers & Brewers Corpn. of America, 21 West Street, New York, plans extensions and improvements, including additional equipment. Cost over $50,000 with machinery.

Rome Automotive Corpn., Rome, N. Y., has been organized by Stuart L. Gerwig, 211 West Pine Street, and Daniel W. Wardwell, 130 Turin Street, both Rome, to manufacture automobile equipment and parts.

Cole Gold Mines, Ltd., Pipestone Bay, Red Lake, Ont., John Y. Cole, Jr., 277 Park Avenue, New York, head, is arranging for stock issue of $2,310,816, part of fund to be used for expansion in gold mining properties and plant.

Waugh Brothers, Ltd., Almonte, Ont., manufacturer of iron and other metal castings, plans rebuilding part of foundry recently destroyed by fire. Loss close to $35,000, with equipment.

SOUTHWEST

Crescent Brewing Co., Joplin, Mo., care of T. E. Martinie, Zahn Building, architect, will take bids soon on general contract for new five-story plant, 150 x 300 ft., with power house. Cost over $100,000 with equipment. Carl Meyers is head.

City Council, California, Mo., has secured Federal loan of $135,000 for new municipal electric light and power plant, using Diesel engine-generating units, and will begin work soon. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Chevrolet Motor Co., 3707 North Union Avenue, St. Louis, has let general contract to A. H. Haeseler Building & Contracting Co., 2346 Palm Street, for new one-story plant unit, 80 x 305 ft., for parts service, inspection and other departments. Cost over $90,000 with equipment.

Keystone Trailer & Equipment Co., Inc., Kansas City, Mo., has been organized by Edward J. Ziegler and Harry N. Brown, 211 East Sixty-seventh Street, to manufacture motor trailers, parts and allied equipment.

Common Council, Okeene, Okla., plans extensions and improvements in municipal electric light and power plant, to include new equipment. Cost $47,000. Federal financing is being arranged.

Humble Oil & Refining Co., Houston, Tex., plans extensions in oil storage and distributing plant at refinery at Baytown, Tex., including new steel tanks and accessory equipment. Cost about $40,000.

National Safety Trap Co., manufacturer of wire animal traps, formerly at Breckenridge, Tex., has leased building at 807 Bryan Avenue, Fort Worth, Tex., and will remodel for new works. Paul E. Mayfield is head.

Constructing Quartermaster, Fort Sam Houston, Tex., asks bids until Jan. 30 for new electric distribution system.

City Council, San Angelo, Tex., is arranging appropriation of $880,000 through Federal loan for new municipal electric light and power plant, using Diesel engine-generating units, work to begin soon. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

City Council, Sweetwater, Tex., plans installation of pumping machinery and other equipment, pipe lines, fittings, etc., for municipal waterworks. Cost about $160,000. Federal financing is being arranged. Freese & Nichols, Capps Building, Fort Worth, Tex., are engineers.

SOUTH ATLANTIC

Constructing Quartermaster, Fort Bragg, N. C., asks bids until Feb. 6 for new ordnance and motor repair shops.

City Council, Charleston, N. C., plans new municipal incinerator, with furnaces, conveying and unloading machinery, and other equipment. Fund of $185,000 has been arranged. Metcalf & Eddy, Statler Building, Boston, Mass., are supervising engineers.

United States Engineer Office, Jacksonville, Fla., asks bids until Jan. 29 for carbon steel cutter casting, forged steel key and spare parts (Circular 379).

Common Council, Live Oak, Fla., plans new 200,000-gal. capacity elevated steel tank and tower, water softening equipment, pipe lines, etc., for extensions and improvements in municipal water system. Fund of $45,000 has been arranged.

Carota Bottling Co., Wallace Building, Greenville, S. C., has taken over former plant of Bloodwine Bottling Co., 302 Bernie Street, and will remodel for new plant. New presses, cutters, labeling machines and other equipment will be installed.

United States Coast Guard, Washington, asks bids until Jan. 30 for new power house and radio station building at station at Jacksonville, Fla.

MICHIGAN DISTRICT

Kalamazoo Brewing Co., Kalamazoo, Mich., has revised plans for extensions and improvements in local building for new brewery. Cost about $75,000 with machinery.

Mid-Western Refining Co., 506 Murray Building, Grand Rapids, Mich., Benjamin J. Skinner, president, has plans for new oil refinery at Alma, Mich., where site was acquired a few months ago. Plant will include storage and distribution units. Cost over $100,000 with equipment.

Automobile Lock Corpn., 8824 Charlevoix Avenue, Detroit, has been organized by Adam J. Urquhart, 1307 Dragoon Avenue, and associates, to manufacture automobile locks and locking devices.

Community Natural Gas Co., Mount Pleasant, Mich., is considering new gasoline refinery in connection with oil and gas properties in Mount Pleasant oil field. Cost close to $80,000 with equipment. J. P. McCloskey is company engineer.

Board of Public Works, Paving Department, City Hall, Detroit, has plans for one-story equipment building, one-story storage and distributing unit, salt storage building and other structures at Western yard. Engineering department is in charge.

SOUTH CENTRAL

Kingham Trailer Co., Inc., 225 East Gaulbert Avenue, Louisville, manufacturer of motor trailers and parts, has work under way on new one-story plant, about 50,000 sq. ft. floor space. Cost over $75,000 with equipment.

Common Council, Troy, Ala., plans new steel hangar, with reconditioning and repair facilities, at new municipal airport, for which financing is being arranged.

Municipal Power Committee, City Council, Knoxville, Tenn., W. A. Cockrum, chairman, has secured Federal loan for $2,600,000 for transmission line, substations and switching stations, and distributing lines for light and power. Connection will be made with proposed new hydroelectric generating plant of Tennessee Valley Authority on Clinch River, about 20 miles from city.

Old Jordan-Old 76 Distillery Co., Covington, Ky., care of Henry W. Jenisch, First National Bank Building, secretary, recently organized,

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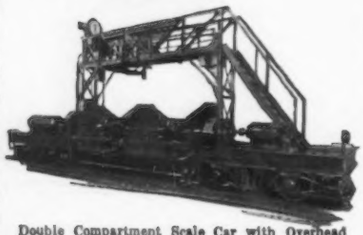

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plans new blending and rectifying plant, with storage and distributing units. Cost over $75,000 with equipment.

Common Council, Jackson, La., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for municipal water system. Fund of $34,000 had been arranged. L. J. Voorhies, Baton Rouge, La., is engineer.

City Council, Middlesboro, Ky., has plans for new municipal electric light and power plant, and electrical distribution system. Fund of $328,000 has been arranged through Federal aid. R. Husselman, Hippodrome Building, Cleveland, is consulting engineer.

WASHINGTON DISTRICT

Owings Mills Distilling Co., Owings Mills, near Baltimore, recently organized by Jacob L. Lansburgh and Henry M. White, capital $200,000, has taken over former power house of United Railways & Electric Co., Baltimore, and adjoining property, for new plant. General contract has been let to B. H. Maas Co., 1119 Ensor Street, Baltimore, for extensions and improvements in two existing structures and erection of four-story unit, 36 x 52 ft., for main distillery. Cost over $85,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Jan. 31 for portable electric drills, pumps, air compressor intercooler, cable, insulated wire, rigid steel conduit, cast iron pipe, malleable iron pipe fittings, magnet wire, switches, etc. (Schedule 2933).

Post Office Department, Washington, asks bids until Jan. 29 for 200 metal separators (Proposal 925) for Hartford, Conn.; 11 steel storage cabinets (Proposals 920 and 923) for Portland, Ore., and Butte, Mont.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Feb. 28 for new steam generating plant at Naval Fleet Air Base, Pearl Harbor, T. H., including 250-hp. cross-drum watertube boiler, steel stack, complete oil and water heating and pumping machinery, oil storage tank, piping and accessory equipment (Specification 7438).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 30 for gears and pinions (Schedule 1569) for Washington Navy Yard; axes, hammers, hatchets and sledges (Schedule 1570) for Eastern and Western yards.

MIDDLE WEST

Arrow Distilleries, Inc., Peoria, Ill., recently organized by M. C. Bradley, Peoria, and associates, has leased two-story building at 401 South Washington Street and will remodel for rectifying, blending and bottling works. Cost close to $30,000 with equipment.

Construction Service, Veterans' Administration, Washington, asks bids until Feb. 20 for fuel-burning equipment for power house at institution at St. Cloud, Minn.

City Council, Morris, Minn., has been authorized to arrange bond issue of $188,000 for new municipal electric light and power plant. Burlingame & Hitchcock, Sexton Building, Minneapolis, are consulting engineers.

Chicago Air Conditioning Corpn., 1503 South Michigan Avenue, Chicago, has been organized by T. F. Hanley, Jr., and M. E. Hanley, to manufacture air-conditioning equipment and systems.

Hiawatha Brewing Co., Hiawatha Avenue and Thirty-first Street, Minneapolis, plans to begin expansion and improvements early in spring when financing for $200,000 for work will be completed. Two-story and basement bottling works will be built and one other unit, with remodeling of several structures formerly used by Lake Street Sash & Door Co. H. Knudsen, head of last noted company is president, with offices at 4001 Hiawatha Avenue.

City Council, Devils Lake, N. D., is arranging fund of $300,000 through Federal loan for new municipal electric light and power plant. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Gates Rubber Co., South Broadway, Denver, is considering new mill unit, either on adjoining site or in another location, for cotton fabric production for automobile tires. Cost over $650,000 with machinery.

Common Council, Morning Sun, Iowa, is arranging financing through Federal aid for $70,000 for new municipal electric light and power plant. H. L. Cory Co., Redick Tower Building, Omaha, Neb., is consulting engineer.

Milwaukee Road sustained loss of about $100,000 by fire which recently gutted car department forge and blacksmith shop of West Milwaukee locomotive and car shops. Department will be rebuilt at once and will require retooling, considerable equipment having been ruined. K. F. Nystrom is superintendent, car department, Milwaukee.

Metropolitan Sewerage Commission, Green Bay, Wis., has rejected bids on control equipment, switch gears and other machinery for new $700,000 sewage disposal project and will take new bids soon. James H. McGinnis, 304 Sheridan Building, is president.

Kellogg Elevator & Grain Corpn., Minneapolis, has placed general contract with Barnett & Record Co., Minneapolis, for 500,000-bu. addition to elevator at Superior, Wis., including receiving and shipping facilities and grain cleaning apparatus.

City of Racine, Wis., has been allotted Federal loan of $756,000 for erection and equipment of proposed sewage treatment plant, designed by Alvord, Burdick & Howson, consulting engineers, 20 N. Wacker Drive, Chicago. James W. Beaugrand is city engineer.

City of Hartford, Wis., has been allotted Federal loan of $40,000 for enlargement of municipal steam generating facilities. Rollin Abbott is city clerk.

Rusk County Highway Commission, Ladysmith, Wis., has plans by G. A. Krasin, architect, Marshfield, Wis., for new service shop and garage, ell-shaped, 60 x 120 and 60 x 50 ft., part two stories, to cost $35,000 with equipment. D. J. Summerville is commissioner.

PACIFIC COAST

Riverbank Co., Riverbank, Cal., Lorenzo Zerillo, president, plans new winery and canning plant at Stockton, Cal., with storage and distributing buildings, and power house. Cost about $200,000 with equipment.

Southern California Edison Co., Edison Building, Los Angeles, has authorized fund of $1,500,000 for extensions and improvements in distributing lines and system, including number of new lines.

Ernest H. Adams, 2068 Belgrave Avenue, Huntington Park, Cal., has plans for new one-story pipe manufacturing and pipe reclamation works, 80 x 300 ft. Cost over $45,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 30 for one motor-driven bolt-threading machine (Schedule 1573) for Mare Island Navy Yard; three motor-driven turret lathes (Schedule 1556), industrial thermometers (Schedule 1592) for Puget Sound yard; two or three 4-wheel trailers (Schedule 1572) for Keyport, Wash., yard; until Feb. 6, motor-driven toolmakers' precision lathe (Schedule 1591) for San Diego yard.

Pacific Continental Grain Co., Portland, care of John C. Veatch, Yeon Building, attorney and representative, plans call for bids early in March for new grain elevator on site of former plant of Standifer Shipbuilding Corpn., Vancouver, Wash. Main unit will be about 75 x 800 ft., and 250 ft. high, equipped with automatic screening machinery, conveying and elevating, and other mechanical equipment. Battery or storage bins will be built. Cost close to $1,000,000 with machinery. Henry W. Collins is president.

Federal Forest Service, Newport, Wash., plans transmission line from power plant on Priest River to experimental station, about 16 miles, for power supply.

Board of Works, Modesto, Cal., has authorized plans for one-story municipal machine shop, 42 x 90 ft. Frank J. Rossi is city engineer.

FOREIGN

Buckingham, Ltd., Footscray, Victoria, Australia, recently organized with capital of £1,000,000 (about $5,000,000) has leased property for manufacture of a six-cylinder automobile, to be known as the "Buckingham," including parts production and assembling departments. Part of works will be used for manufacture of motor trucks. In near future company plans erection of new plant for initial output of over 1500 cars and trucks a year. A unit for production of aeroplane engines is also projected. Entire development will cost over $700,000.

Madras State Department of Public Works, Madras, India, plans early call for bids for new transmission line from Erode to Trichinopoly, with substations and distributing facilities. Cost over $750,000 with equipment.

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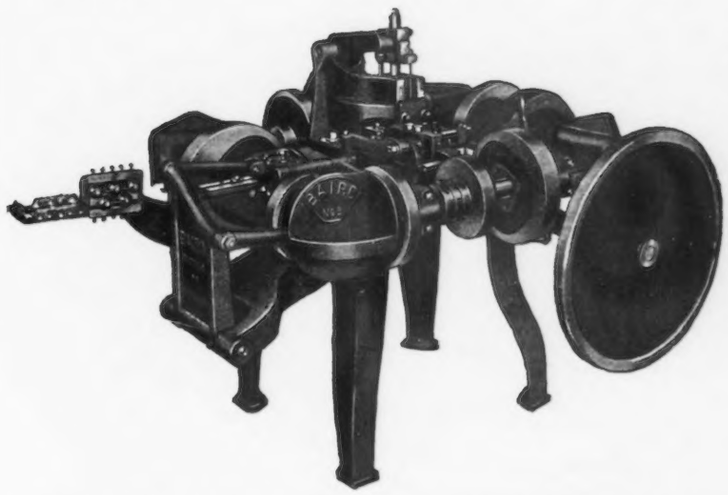
For Automatic Wire Forming



When manufacturers want better work at greater speed in producing forms from wire and ribbon metal, they usually turn to the Baird Four Slide Automatic Forming Machine.

Over 60 years of Baird experience have developed this machine to a place in the front rank for forming, cutting, punching and marking.

"Ask BAIRD About It"

THE BAIRD MACHINE COMPANY
BRIDGEPORT, CONN.

Molding Cast Iron Belt Pulleys

(*Concluded from Page* 19)

or four points when closing the mold, but are not really necessary, as the careful workman can easily center the plate by the accurate eye judgment possessed by every skilled molder.

After the plate is replaced, the pouring head is built up, a few small flat weights laid over the arms, very little weight being needed, as, by reason of the open rim forming a continuous circular riser, the static pressure when pouring is greatly reduced.

The overflow risers shown at the corners in the views of the closed mold in Fig. 5 are cut on the joint for emergency, or as a fool-proof measure, because when pouring the molds, it is necessary to check the flow of metal as soon as the rim is full to avoid an overflow and consequent flanging round the top of the rim. Immediately after filling the rim, pouring is held up for a few seconds, just long enough to allow a little water to be sprinkled on the upper edge of the rim, which solidifies immediately, the head being then filled up with metal to allow the usual rod feeding.

The method just outlined is simple and turns out excellent castings remarkably free from fins, the superfluous depth of about ¾ in. holding what little dirt rises, and, as stated above, is easily removed in the lathe by the use of a parting tool.

As to the smaller sizes, as in the case of a new textile or similar mill installation, where orders are frequently placed for several hundred pulleys of a single size, the use of a plain jolt molding machine will reduce the production cost considerably. The molding equipment necessary is, as in the manufacture of the larger sizes, a rim pattern for each diameter, a spider arm pattern, and a lifting plate of the design just described, plus an adjustable follow board, shown with pattern and flask in position on the jolt table at Fig. 6.

The outside circular blocks laid on the follow board face to control the height at which the flask is to be placed, are indicated at B, B, and the inner structure to regulate the position of the arms is marked C. C. Both are adjustable and capable of being built up to any desired height by inserting or removing ordinary lagging blocks. One foundation board can thus be used for several sizes.

The flasks, in order to withstand the wear and tear of constant jolting, should be of one piece design, either of steel or iron. They may be circular or square, and, owing to their handy size, serve admirably as general purpose equipment, and need seldom be idle.

Once the flask is filled with sand, jolted, and the bottom board placed on and clamped, the mold is taken from the machine en bloc and rolled over on the floor in its appointed place, the procedure from this point being exactly the same as when making the larger sizes, as the follow board when lifted off the drag leaves a ready-made parting around the arms, also an impression to receive each wing of the lifting plate.

Using a 12 per cent semi-steel mixture analyzing, approximately, manganese, 0.50 to 0.70 per cent; phosphorus, 0.30 to 0.60 per cent; sulphur, maximum, 0.10 per cent, and silicon, 2 to 2.40 per cent, excellent results are obtainable. Experience from a group of shops shows the average foundry scrap on this item to be around 3 per cent of total output.

A Molding Unit for Mass Production

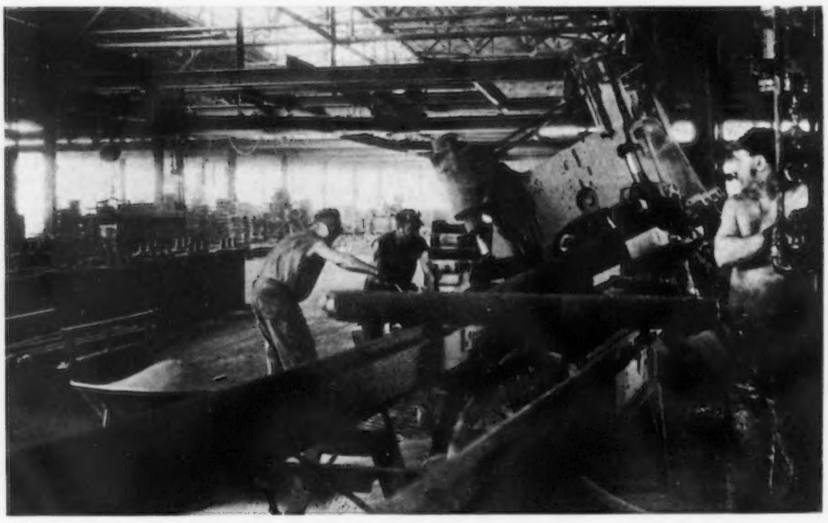
(*Concluded from Page* 25)

arrive, one by one, together with and opposite to the baked cores as they emerge from the oven. A hoist at this point removes the core sets from the oven conveyor chain and lowers them into the molds.

The cupola is set opposite the next station and the ladles of molten iron are brought to the molds on an overhead trolley and poured at this point. The molds are then pushed to the end and across to the other side of the conveyor unit and down this side to the shake-out station. The distance between the pouring and shake-out station is just sufficient for the casting to "set" before removal. Here the flasks are transferred by crane to a vibrator and the pipe castings and sand shaken out. These castings, still containing the arbors, are transferred six at a time by another crane to a transfer table where they are rolled onto another vibrator which removes the cores and arbors. The arbors go to the core-making station, the flasks to the molding station and the pipe to the cleaning room.

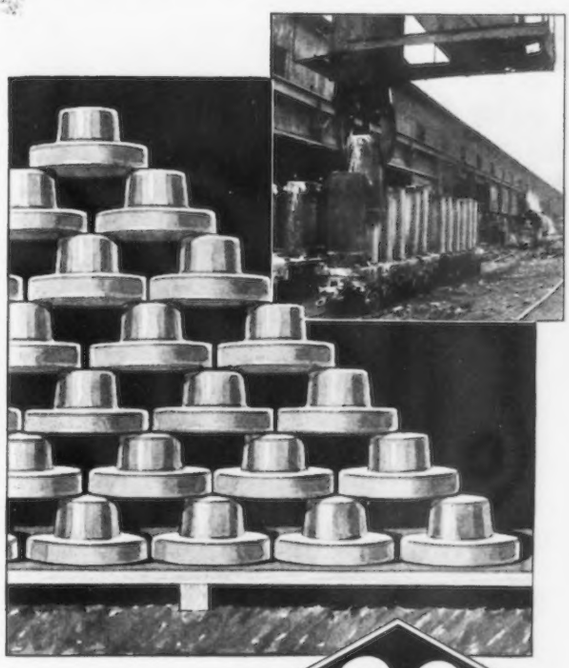
Flask baking or drying is accomplished on that portion of the roller conveyor between the molding and core-setting stations by a series of gas burners. These fire up through holes in the bottom plates directly into the molds, where the heat passes upward, as in a stack, and drys the green sand. Each mold as it moves along intermittently stops over a set of these burners between pushes, and the total period of these stops is just enough to dry it out. Without doubt, this is one of the most efficient foundry layouts in America.

The pipe is then cleaned, tested at 350 lb. water pressure and finally inspected for metal line, inside diameter, outside diameter and minor defects. A portion of the product is welded up to 40-ft. lengths while the ends are threaded, both undergoing a rigid inspection before shipment.



Arbor and core shakeout machine. Castings are rolled into the machine, clamped and vibrated. The arbor is thus removed from the casting.

For
sound dense forgings
use
sound dense steel



SPECIAL HIGH GRADE
ASCO
FORGING BILLETS

The finished forging reflects the billet from which it is made. It can be no better than the billet.

Carefully established manufacturing methods together with close metallurgical supervision, liberal chipping and discard, make ASCO Forging Billets sound, dense, *completely dependable.*

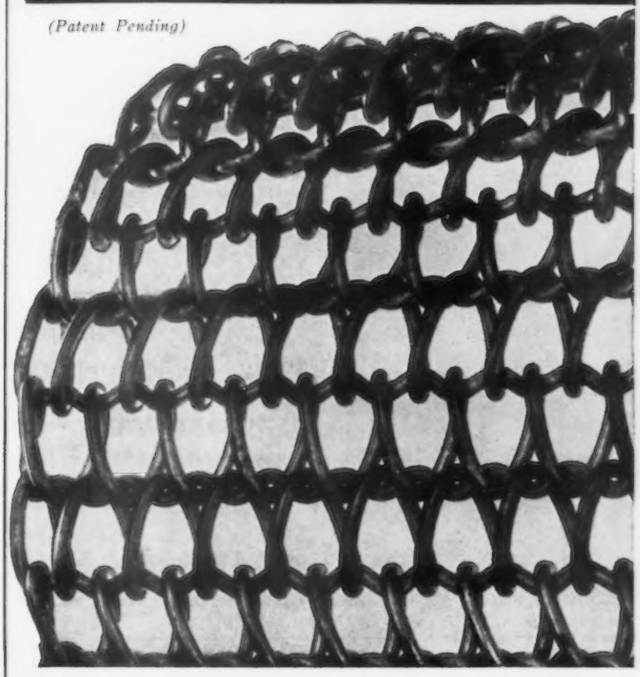
Whatever your requirements in steels, our metallurgical laboratories are at your service.

THE ANDREWS STEEL CO.
NEWPORT KENTUCKY

Carbon, Chrome, Chrome Molybdenum, Chrome Nickel, Chrome Vanadium, Molybdenum, Nickel, Nickel Molybdenum, Vanadium Billets and Slabs.

ANNOUNCING
BALANCED SPIRAL
CONVEYOR BELT
proven by both laboratory and field tests over a period of nine months in nine major industries.

(Patent Pending)



TRUE RUNNING because the spirals are balanced . . . woven *alternately* right and left. This eliminates the tendency to creep sideways.

FLAT because the spirals are not woven into each other, but are connected by the crimped reinforcement member.

HOLDS ITS SHAPE. The crimped reinforcement member prevents shrinkage in width and thus removes any tendency toward undue elongation.

COMPLETELY FLEXIBLE. The free movement of the loop of the spiral on the reinforcement member makes this belt the most flexible yet devised.

This Balanced Spiral is made in all sizes and all kinds of wire and each belt is fabricated only after due engineering analysis from data given on a questionnaire by the user. Thus every Wissco Belt is built for a specific service.

Wickwire Spencer Steel Company, 41 East 42nd Street, New York City; Buffalo, Chicago, Detroit, Philadelphia, Tulsa, Worcester; Pacific Coast Headquarters: San Francisco; Warehouses: Los Angeles, Portland, Seattle; Export Sales Department: New York City.

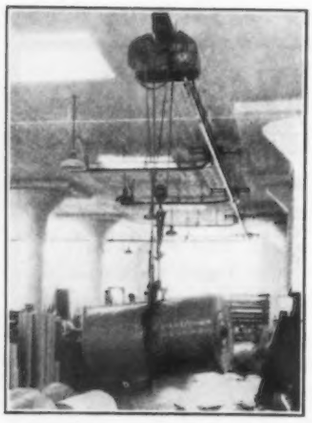
WISSCO CONVEYOR BELTS

Wickwire Spencer Steel Co.
41 East 42nd Street, New York City
I would be pleased to receive one of your new Handbooks on Metal Conveyor Belts.

Name .....

Company .....

Address .....IA



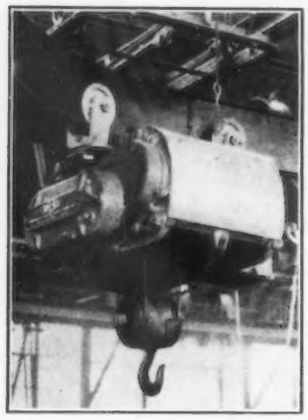
LO-HED on American Monorail

100% Hoist Service PLUS

The LO-HED Hoist will do anything any other hoist will do—will go anywhere any other hoist will go—PLUS.

This plus factor is its ability to operate in extremely low head room. It means: (1) it can take its load over higher obstacles, (2) it can operate through smaller wall openings, (3) it can lift loads higher, (4) it can pile things higher and save storage space.

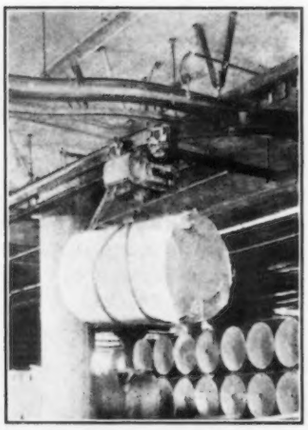
Wherever heavy weights must be lifted or moved the LO-HED speeds up the work and increases output. Get the details.



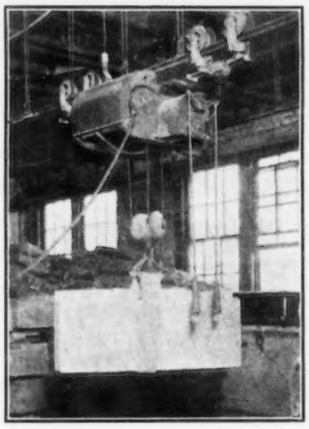
LO-HED on Philadelphia Tramrail

AMERICAN ENGINEERING

AMERICAN ENGINEERING CO., 2410 ARAMINGO AVE., PHILADELPHIA



LO-HED on Richards-Wilcox Trolley



LO-HED on Louden Monorail

Standardizing the Refining Period in Making Steel

(*Concluded from Page* 17)

curately, not only in regard to its structure but also its lustre and affinity for slag particles, which in turn furnish him with a true picture of the carbon content, degree of purification of the bath and finally the temperature of the bath. For obvious reasons the problem becomes considerably more complicated when the ore is added by the box load rather than by the shovelful, especially, when "the lime is not up."

Recommends Sample Test Pieces for Standards

Therefore, it should be of a decidedly mutual advantage if the benefits of a systematic study of the laws governing the relationship between the carbon content of the test piece and its structure could be given to all concerned. From a practical standpoint, the result of such a research could easily be conveyed to the furnace men by displaying, say, in a specially lighted show case a series of test fractures, ranging all the way from, say, 0.06 to 1.00 per cent carbon with the characteristics of each one pointed out on an attached note. The series would need to cover only the key structures. Daily consultation of this display and comparison with current test pieces would undoubtedly tend to eliminate a lot of expensive guesswork, thus paving the way for a more rigid control of the heat.

Perhaps the strongest point in favor of a standardiized "working the heat" period is the striking contrast in methods now in use when adding the oxidizing agent to the bath and the deoxidizing agents to the ladle. In the former case it is entirely up to the individual judgment to decide how much is to be charged, while in the latter case the amount to be added is arrived at by calculations on precise information. Because the figures arrived at when scientifically estimating a needed weight of the oxidizing agent, the iron ore, must be considered somewhat approximate, for reasons already stated, the displayed fractures would very likely serve as a valuable measuring standard against the widely fluctuating judgment of the more or less experienced furnace operator.

Century of Progress In Full Colors

A NEW brochure "Color and Protection" has been prepared by American Asphalt Paint Co., 43 E. Ohio St., Chicago, and is now ready for distribution. It contains a reproduction of 35 of the most important of the buildings at the Century of Progress, printed in 13 water colors, silver and gold.

Having been awarded the contract to furnish and apply the paint for all major World's Fair buildings (inside and outside), this company was especially interested in making its book an authentic record of the progress of color in industry.

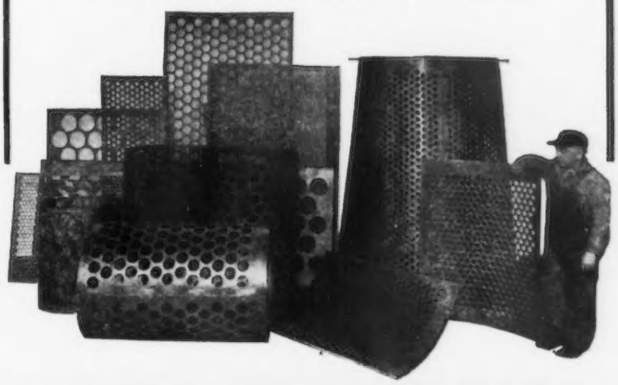
The fair management has credited this book as being the only reproduction of the genuine flat color effects as designed by the late Joseph Urban.

SCREENS of Perforated Metal

For a Thousand Uses

For Grain, Minerals, Chemicals or any other material to be screened
Ornamental Designs for Grilles, Cabinets, etc.

Any Metal—Any Perforation



The Harrington & King PERFORATING CO.

5657 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N.Y.

HENDRICK
PERFORATED METALS

Perforated Metal Screens in steel, bronze, Stainless Steel, Monel, Aluminum, Everdur and other metals. Perforated Grilles in various metals and many special designs.
Mitco Open Steel Flooring, Mitco Shur-Site Treads, Mitco Armorgrids; also elevator buckets, conveyor troughs and products fabricated from heavy plate. Write for catalog.

HENDRICK MFG. CO.
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Cutting Off Machines for Sawing All Kinds of Metals

THE ESPEN-LUCAS MACHINE WORKS
FRONT AND GIRARD AVE. PHILADELPHIA, PENNA.

Landis makes a complete line of threading equipment. Depend upon it, if you have a threading operation, Landis has a machine, die head or tap that will handle the job to better advantage.

Write today for literature.

LANDIS MACHINE CO., Inc.
Waynesboro, Penna., U. S. A.

JUST BETWEEN US TWO

Bank Stock Rises

Carter Glass recently said, according to *Time:*

"In my town they lynched a banker the other day for marrying a white woman."

A Hit, a Palpable Hit!

EVEN allowing for a very considerable bias, it is our carefully considered opinion that the big book, our Annual Number, is the finest we have ever issued. We might add modestly that it offers a new high mark for publishers of trade papers, ourselves included, to shoot at.

Judging from the flood of bouquets now laving our freely exposed foreheads, we are not alone in that opinion.

Thar's gold in that thar book, and you don't have to dig very deep to find it. The *pièce de résistance* is the lead-off article, the report of the survey of the industry's present problems. Under the cloak of anonymity manufacturers spoke their minds frankly And if you have not read the six-point items beginning on page 30 by all means take your copy of the Annual home with you tonight and do so. Then follow on with pp. 27-28 in the Jan. 11 I.A.

It's an X-ray telescope that enables you to peer into the collective industrial mind. We have yet to see a more intimate and accurate array of data revealing industry's fears, problems, hopes, and suggested remedies for the economic ills that plague us. A valuable document for the dossier of whoever writes the history of the threnetic thirties.

Bang Goes Another Illusion

SOME of our bar-fly acquaintances had convinced us that the pretzel was one of the few products that had withstood the onslaught of the machine age. "Absolutely they're hand-bent," they told us. "Why, if you look closely you can see the imprint of the pretzel-bender's thumb on each and every pretzel."

Even though we couldn't quite see the thumbprint, we believed them, blaming our myopic optics. But now a subscriber reports that he makes pretzel-manufacturing equipment. Is nothing sacred?

Praise From Sir Hubert

IF you know any advertising agents, you'll admit they don't ecstasize very readily, at least in front of publishers. Imagine our amazement when one called on us the other day and unleashed panegyric after panegyric over the study in the Annual Number entitled, "In Planning 1934 Industrial Sales, You Must Consider These Trends."

"Best I've ever seen," he eulogized, adding in astonishment, *"It's better than I could do myself and I'm in the business!"* See page 51 of the Annual. Read slowly and thoughtfully. It's worth it.

Cleveland Conquers

THE bridge problem published here on Jan. 11 yielded to the expertness of J. D. Allan, Pratt & Whitney's Cleveland sales manager. Too wise to fall into the error of discarding a spade, he used 'em to get back into declarer's hand, grand-slamming.

Nude Gents Score

THE unclothed Tarzans in the Annual Number, symbolizing mechanical handling, steel, power transmission, etc., scored a personal success. Readers want copies for framing, evidencing the great strides in broad-mindedness that have been made since the loin-cloth '90s.

A. H. D.

Cone 4-Spindle Automatics

Are economical and accurate producers of screw machine parts up to 6" diameter 7" milling length. They cut costs, increase production, boost profits.

Write for particulars

CONE AUTOMATIC MACHINE CO., Inc.
WINDSOR, VERMONT

REPRESENTATIVES:

Detroit: J. C. Austerberry's Sons, 634 E. Congress St., Detroit, Mich.
Chicago: John H. Glover, 2127 North Sayre Ave., Chicago, Ill.
Ohio: S. B. Martin, 1077 Erie Cliff Drive, Lakewood, Ohio.
New England: Potter & Johnson Machine Co., Pawtucket, R. I.
Indiana: G. A. Richey, Chamber of Commerce Bldg., Indianapolis, Ind.
New York State: Syracuse Supply Co., Syracuse, N. Y., also Rochester, N. Y.
Pennsylvania: Arch Machinery Co., 1005 Park Bldg., Pittsburgh, Pa.
Philadelphia: Lloyd & Arms, Inc., 133 South 36th St., Philadelphia, Pa.
California: C. F. Bulotti Machinery Co., 829-831 Folsom St., San Francisco, Calif.

ABRASIVE SURFACE GRINDER

Either Horizontal or Vertical Spindle Type Countershaft or Motor Drive

Get our bulletin for particulars

ABRASIVE MACHINE TOOL CO., East Providence, R. I.

THE CLEVELAND STEEL TOOL CO.

Punches. Dies. Chisels. Rivet Sets
660 E. 82nd St. Cleveland, O.
If it's RIVETED you KNOW it's safe

Save all Forgings, 70% of Grinding

FOR every operation of Lathe, Planer, Slotter and Shaper. Over 10 modifications of shape and size.

ARMSTRONG TOOL HOLDERS

Catalog B-27 sent on request.

ARMSTRONG BROS. TOOL CO., CHICAGO

Look for this Mark —the quality sign of "The Tool Holder People"

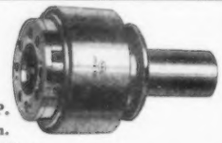
H&G DIE HEAD

CUT THREADS
BETTER
QUICKER
CHEAPER

Sizes and Styles for All Machines

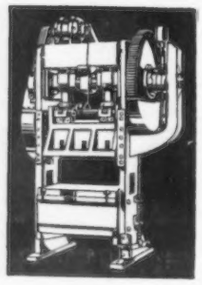
THE EASTERN MACHINE SCREW CORP.
21-41 Barclay St., New Haven, Conn.

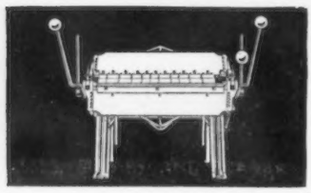
Pacific Coast Representatives:
Los Angeles, A. C. Behringer, 312-316 Commercial St., Los Angeles, Cal.
San Francisco, A. H. Coates Co., 1142 Howard St., San Francisco, Cal.



CHICAGO

BUILT OF STEEL





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DREIS & KRUMP MFG. CO.
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ABRASIVE CLOTH & PAPER
Norton Co., Worcester, Mass.

ABRASIVES—Steel Shot and Grit
Pangborn Corp., Hagerstown, Md.

ACCUMULATORS—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Wood, R. D., & Co., Philadelphia.

ACETYLENE—Dissolved in Cylinders
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

ACIDS—Pickling
American Chemical Paint Co., Ambler, Pa.

AIR TANKS AND CYLINDERS
Scaife, William B., & Sons Co., Ptgh.

ALLOYS—Calcium-Silicon
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Magnesium
Dow Chemical Co., Midland, Mich.

ALLOYS—Phosphor Bronze
Phosphor Bronze Smelting Co., Philadelphia.

ALLOYS—Silico-Manganese
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ALLOYS—Titanium
Metal & Thermit Corp., 120 B'way, N. Y. C.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

ALLOYS—Tungsten
Vanadium Corp. of America, 120 Broadway, N. Y. C.

ALLOYS—Vanadium
Vanadium Corp. of America, 120 Broadway, N. Y. C.

ALLOYS—Zinc Base Die Casting
New Jersey Zinc Co., Inc., The, 160 Front St., N. Y. C.

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Aluminum Co. of America, Pittsburgh.

AMMONIA RECOVERY PLANTS
Koppers Construction Co., The, Pittsburgh.

ANGLES, BEAMS, CHANNELS AND TEES
Carnegie Steel Co., Pittsburgh.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Manealoff & Co., Inc., 19 Rector St., N. Y. C.
Ryerson, Jos. T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Weirton (W. Va.) Steel Co.

ANGLES, BEAMS, CHANNELS & TEES —Magnesium Alloys
Dow Chemical Co., Midland, Mich.

ANNEALING—See Heat Treating

ANODES—All Types
Udylite Process Co., Detroit.

ANODES—Cadmium
Udylite Process Co., Detroit.

ARBORS
Morse Twist Drill & Mch. Co., New Bedford, Mass.

ARRESTERS—Spark
Harrington & King Perforating Co., Chi.

AXLES—Car or Locomotive
Carnegie Steel Co., Pittsburgh.
Illinois Steel Co., Chicago.

BALLS—Steel, Brass or Bronze
Auburn Ball Bearing Co., 63 Clarissa St., Rochester, N. Y.
New Departure Mfg. Co., Bristol, Conn.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BANDS—Steel
Bethlehem (Pa.) Steel Company.
Inland Steel Co., Chicago.

BANDS—Welded
Amer. Welding & Mfg. Co., Warren, O.

BARRELS—Burnishing
Globe Mch. & Stpg. Co., Cleveland.

BARRELS—Tumbling
Baird Mch. Co., Bridgeport, Conn.
Globe Mch. & Stpg. Co., Cleveland.

BARS—Alloy
Allegheny Steel Co., Brackenridge, Pa.
Republic Steel Corp., Youngstown, Ohio.

BARS—Aluminum
Aluminum Co. of America, Pittsburgh.

BARS—Brass & Bronze
Johnson Bronze Co., New Castle, Pa.

BARS—Cold Drawn
Union Drawn Steel Co., Massillon, Ohio.

BARS—Concrete, Reinforcing
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Laclede Steel Co., St. Louis, Mo.

BARS—Magnesium Alloys
Dow Chemical Co., Midland, Mich.

BARS—Steel
Ames, W., & Co., Jersey City, N. J.
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Carnegie Steel Co., Pittsburgh.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Joseph T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Timken Roller Bearing Co., Canton, Ohio.
Timken Steel & Tube Co., The, Canton, O.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co.

BASES—Column, Machinery
Lukens Steel Co., Coatesville, Pa.

BATTERIES—Storage
Electric Storage Battery Co., Phila.

BATTERY CHARGERS
Cutler-Hammer, Inc., Milwaukee.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Babbitt
Bunting Brass & Bronze Co., Toledo, O.
Cramp Brass & Iron Foundries Co., Phila.
Johnson Bronze Co., New Castle, Pa.

BEARINGS—Ball
Auburn Ball Bearing Co., 63 Clarissa St., Rochester, N. Y.
Bantam Ball Bearing Co., South Bend, Ind.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
New Departure Mfg. Co., Bristol, Conn.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BEARINGS—Brass and Bronze
Bunting Brass & Bronze Co., Toledo, O.
Cramp Brass & Iron Foundries Co., Phila.
Johnson Bronze Co., New Castle, Pa.

BEARINGS—Laminated, Non-Metallic
Synthane Corp., Oaks, Pa.

BEARINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BEARINGS—Quill Roller
Bantam Ball Bearing Co., South Bend, Ind.

BEARINGS—Radial
Bantam Ball Bearing Co., South Bend, Ind.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BEARINGS—Roller
Bantam Ball Bearing Co., South Bend, Ind.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Timken Roller Bearing Co., Canton, O.

BEARINGS—Roller Tapered
Bantam Ball Bearing Co., South Bend, Ind.
Timken Roller Bearing Co., Canton, O.

BEARINGS—Shaft Hanger
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H. Collier Smith, Jr., President ST. MARYS, OHIO

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(REGISTERED IN U.S.A. AND FOREIGN COUNTRIES)

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